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Association Between Serum Uric Acid Level and Psoriasis: A Case Control Study

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Abstract

Introduction: Psoriasis is a common, chronic, inflammatory and proliferative condition of the skin, associated with various disorders including metabolic syndrome. High serum uric acid levels are also associated with metabolic syndrome. Hyperuricemia is associated with psoriasis and psoriatic arthritis.

Objectives: To find out the association of serum uric acid with psoriasis.

Materials and Methods: It was a case-control study including 104 patients, among them 52 were psoriatic patients (case) and 52 had disease other than psoriasis (control) after matching for age and sex. The study was conducted at Department of Dermatology, Universal College of Medical Science, from January- December 2017. Clinical examination and proforma documentation including patient details, laboratory values of serum uric acid level, Psoriasis Area and Severity Index score were studied.

Results: Mean SUA in psoriasis patients was 4.70±1.37 mg/dl in female, 5.57±1.18 mg/dl in male whereas 4.85±0.74 mg/dl in female and 4.34 ± 0.98 mg/dl in male respectively in control group (p=0.002). Six (18.88%) male and three (15.78%) female patients with psoriasis had higher serum uric acid value whereas only four (3.84%) patient had higher serum uric acid value in control group (p=0.012). There was association between serum uric acid and psoriasis.

Conclusion: Our study concludes that serum uric acid level is increased in psoriasis patients when compared with controls. Monitoring of psoriatic patients for high serum uric acid levels during treatment and follow up should be done to prevent its deleterious effect on psoriasis.

Key words: Arthritis, Psoriatic; Psoriasis; Uric Acid

Introduction

Psoriasis is a common, chronic, inflammatory and proliferative condition of the skin, clinically characterized by red, scaly, sharply demarcated, indurated plaques covered by silvery white scale associated with systemic manifestations in many organ systems.[1] It affects 2 to 4% of the population with the age of onset occurring in two peaks.[2] Psoriasis is associated with various disorders including metabolic syndrome (MetS).[3] High serum uric acid(SUA) levels are also associated with the components of MetS.[4] Hyperuricemia in psoriasis patients may be attributed to enhanced epidermopoiesis with increased epidermal turnover time. The rapid epidermal turnovers may lead to an increased purine breakdown and may influence the serum uric acid level.[5] Studies conducted in Israel, Germany and Russia revealed higher level of uric acid in patients with psoriasis.[6, 7, 8]

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Increased serum levels of uric acid was associated with MetS which positively correlated with Psoriasis Area and Severity Index score (PASI), body mass index and body surface area compared to a normouricemic group.[9]

Therefore, this study enables us to see the association of serum uric acid with psoriasis and its severity in context to our population.

Materials and method

This case control study was conducted in Department of Dermatology, Universal College of Medical Sciences (UCMS), Bhairahawa, Nepal from January to December 2017. All patients with psoriasis attending the Dermatology outpatient department (OPD) of UCMS, Bhairahawa, who gave consent for clinical examination and were willing to do laboratory investigation were included in the study. Patients/ Guardians who did not give consent because of any reason, patients with previously diagnosed gouty arthritis or primary hyperuricemia with other renal diseases, taking hypouricemic or hyperuricemia drugs were excluded.

As the number of psoriasis patients visiting the Dermatology OPD of UCMS was 52 the previous year, the sample size was calculated [10]. 104 patients were enrolled, among them 52 were cases suffering from psoriasis meeting the inclusion criteria and 52 were controls with disease other than psoriasis after matching for age and sex. Consecutive sampling technique was used. After selection of the cases and controls, proper counseling and explanation of the procedure was done. Clinical examination with proforma documentation including patient details, examination findings and laboratory values of serum uric acid level were studied.

Serum uric acid level estimation was done by Uri case/ PAP (Phosphatidic Acid Phosphates) method. The upper limit of the reference range for men is 7 mg/dl and for women is 6 mg/dl.

PASI score was calculated for each case of chronic plaque psoriasis. For each of four anatomic areas (head, upper limb, trunk and lower limbs), the severity of erythema, induration, and scaling, and the percentage of surface area involvements were assessed. PASI scores can range from a lower value of 0, corresponding to no signs of psoriasis, up to a 72.0 as theoretic maximum.

The data were entered in Microsoft Excel and transferred to IBM – Statistical Package for Social Sciences (SPSS) version 20. We calculated frequencies, percentage, mean, standard deviation, analytical tests Chi square test and Analysis of Variance (ANOVA). A 'p' value less than 0.05 was taken to denote significant relationship.

Before conducting the study, the proposal was submitted to the Institutional Review Board (IRB) of UCMS and the ethical clearance was taken. The will of the subjects were fully respected and a written consent was taken after fully explaining all the relevant details, its importance and implications. Those who did not give consent for any reason were excluded from the study. Confidentiality was maintained.

Results

The age range of cases was from 11 to 80 years. The maximum number of patients belonged to age group of 31-40 years with 15 (28.8%) patients in each control and psoriasis group. The mean age of the control group and psoriasis patients was 39.65±15.64 years and 42.73±16.48 years respectively. The distribution according to gender showed thirty three (63.5%) males and nineteen (36.5%) females in each control and psoriasis patients. The male: female ratio was approximately 1.7:1 (Table 1).

The patients in psoriatic group revealed higher SUA level >6 mg/dl (i.e. 6-6.9 mg/dl, 7-7.9 mg/dl and >8 mg/dl categories) in comparison to the control group. Six (18.88%) male and three (15.78%) female patients with psoriasis had higher SUA value whereas only four (3.84%) patient had higher SUA value in control group (p=0.012). The mean SUA in psoriasis patients was 4.70±1.37 mg/dl in female, 5.57±1.18 mg/dl in male whereas 4.85±0.74 mg/dl in female and 4.34 ± 0.98 mg/dl in male respectively in control group (p=0.002) (Table 2).

As there is increase in PASI score there is statistically significant increase in SUA level (p= 0.021) where > 20 PASI score has been shown with frequency of one (25%) in < 5.0 mg/dl, 5.0-5.9 mg/dl, 6.0-6.9 mg/dl and >8 mg/dl. Similarly, 10.1-20 PASI score has been observed with frequency of seven (46.7%) in <5 mg/dl, two (13.3%) in 5.0-5.9 mg/dl, three (20%) in 6.0-6.9 mg/dl and 7.0-7.9 mg/dl respectively (Table 3).

Mean SUA in different categories of psoriasis based on PASI Score with ≤10, 10.1-20 and >20 were observed to be 4.77±0.85, 5.33±1.36 and 5.82±1.97 mg/dl respectively which is in increasing order as severity increases (p=0.137)

Table 1: Distribution of control and psoriasis patients according to the demographic details

Specifications	Control (%)	Psoriasis (%)	Total	p-value
AGE GROUP (YEARS)				
<20	4(7.7%)	6(11.5%)	10(9.6%)	0.822
21-30	10(19.2%)	6(11.5%)	16(15.4%)	
31-40	15(28.8%)	15(28.8%)	30(28.8%)	
41-50	10(19.2%)	7(13.5%)	17(16.3%)	
51-60	7(13.5%)	11(21.2%)	18(17.3%)	
61-70	4(7.7%)	4(7.7%)	8(7.7%)	
71-80	2(3.8%)	3 (5.8%)	5(4.8%)	
GENDER				
Male	33(63.5%)	33(63.5%)	66(63.5%)	1.0
Female	19(36.5%)	19(36.5%)	38(36.5%)	

Table 2: Distribution of SUA in cases and Psoriasis according to gender

SUA categories	Control		Psoriasis		Total	p-value
	Male	Female	Male	Female		
<5 mg/dl	22(21.15%)	11(10.57%)	12(11.54%)	12(11.54%)	57(54.80%)	0.012
5-5.9 mg/dl	9(8.65%)	6(5.76%)	7(6.73%)	4(3.84%)	26(25%)	
6-6.9 mg/dl	2(1.92%)	2(1.92%)	8(7.7%)	1(0.96%)	13(12.5%)	
7-7.9 mg/dl	0(0%)	0(0%)	5(4.80%)	2(1.92%)	7(6.73%)	
≥8 mg/dl	0(0%)	0(0%)	1(0.96%)	0(0%)	1(0.96%)	
Total	33(31.73%)	19(18.26%)	33(31.73%)	19(18.26%)	104(100%)	
Mean ± SD	4.34±0.98	4.85±0.74	5.57 ± 1.18	4.70 ± 1.37		0.002

Table 3: Cross tabulation between SUA and PASI score in Chronic Plaque Psoriasis

PASI Score	UA Gr.					Total	p-value
	<5	5.0-5.9	6.0-6.9	7.0-7.9	≥ 8.0		
≤10	15	8	3	0	0	26	0.021
	(57.7%)	(30.8%)	(11.5%)	(0.0%)	(0.0%)	(100.0%)	
10.1-20	7	2	3	3	0	15	
	(46.7%)	(13.3%)	(20.0%)	(20.0%)	(0.0%)	(100.0%)	
>20	1	1	1	0	1	4	
	(25.0%)	(25.0%)	(25.0%)	(0.0%)	(25.0%)	(100.0%)	
Total	**23**	**11**	**7**	**3**	**1**	**45**	
	(51.1%)	**(24.4%)**	**(15.6%)**	**(6.7%)**	**(2.2%)**	**(100.0%)**	

Discussion

Our study showed that the mean age group of control and psoriasis was 39.6± 65 years and 42 ± 16.48 years respectively. However, in a study done by Solak et al.[11] the mean age was 44.1 ±14.4 years among psoriasis and 44.1 ± 14.4 years among control group. Similarly Das et al. showed mean age of 41.5±18.5 years among controls and 39.7 ± 7.3 years among psoriasis group.[12]

In this study the male patients were predominant comprising of 63.5% of study patients (n=33) and female patients were 36.5% (n=19). The male predominance was also noted in a study done by Sampogna et al.[13] The male to female ratio was approximately 1.7:1 in our study which was in accordance to a study done in Japan where the ratio was 1.98:1 done by Takahashi et al.[14]

Elevated uric acid levels are frequent finding in psoriasis. Our study showed significant association between psoriasis and serum uric acid with p-value of 0.012. Similarly, Ukonu and Ibekwe [15] found a prevalence of 40.7% of hyperuricemia among psoriasis patients as compared to 7.0% of the control group (p=0.001) which showed strong association

between hyperuricemia and psoriasis. Likewise, study done by Isha Jain and Lal Harbans et al.[16] showed elevated uric acid among (7.0±0.64 mg/dl) psoriasis patient. Our findings have clinical implications as elevated SUA causes gouty arthritis, which needs to be differentiated from psoriatic arthritis in clinical practice. In addition, elevated SUA is associated with increased carotid-artery intima-media thickness in patient with psoriatic arthritis, and independently predicts the development of cardiovascular events and mortality in nonpsoriatic populations.[17] Therefore, SUA levels should be routinely measured in patients with psoriasis for proper management and to minimize the severity of the disease.

In our study the mean SUA in psoriasis patients was 4.70±1.37 mg/dl in female, 5.57±1.18 mg/dl in male whereas 4.85±0.74 mg/dl in female and 4.34 ± 0.98 mg/dl in male respectively in control group (p=0.002) which was statistically significant. In a similar study done by Kwon HH et al.[18] the mean SUA was 5.1 ± 1.5 mg⁄dL with (P < 0.01) which was statistically significant.

In our study, there is statistically significant increase in SUA level with PASI Score (p-value= 0.021). Similarly, Gisondi et al.[17], Neimann et al.[19] showed the psoriasis severity and BMI partly contribute to the increased SUA of patients. Hence, a positive correlation of SUA level with psoriasis severity was noticed. However, Cassano et al.[20] from Italy in 2011, did not reveal any relationship between serum uric acid level and the PASI score (p=0.34).

In our study the mean SUA of psoriasis based on PASI Score with ≤10, 10.1-20 and >20 were observed to be 4.77±0.85 mg/dl, 5.33±1.36 mg/dl and 5.82±1.97 mg/dl respectively, which is in increasing order as severity increases. Likewise, in a study done by Solak et al.[11] mean PASI was 14.4 ± 7.8 and 8.7 ±7.5 respectively.

The main limitation of this study was the relatively small sample size and limited time frame. It was a single center based one time case-control assessment and lacked follow up so the results acquired may not be applicable to the general population.

Conclusion

Our study concludes that serum uric acid level is increased in psoriasis patients when compared with controls which suggest an association of psoriasis, SUA levels and PASI scores. This information directs for monitoring of psoriatic patients for SUA levels during treatment and follow up. The information on SUA can be used to prevent the deleterious effect of high SUA levels on psoriasis and can provide further guidance for treatment.

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