

Original Article**A Study of Serum Uric Acid Level in Patients with Psoriasis at a Tertiary Care Hospital in Eastern Nepal****Manish Pradhan, Anjan Rai, Sunita Karki, Rajiv Yadav, Sanjeev Yadav**

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Article Received: 15th April, 2021; Accepted: 18th December, 2021; Published: 30th June, 2022**DOI: <https://doi.org/10.3126/jonmc.v11i1.45719>****Abstract****Background**

Meta-analysis has shown that psoriasis is associated with hyperuricemia and its sequel. So this study was done with objective to find out the association of serum uric acid level in patient with psoriasis and its correlation with severity of the disease.

Materials and Methods

It was a prospective case control study conducted in the department of Dermatology, Nobel Medical College Teaching Hospital in eastern region of Nepal over a period of one year from January 2020 to December 2022 after approval of Institutional review committee on Nobel Medical College Teaching Hospital. The diagnosis of the disease for the cases were done by clinical examination and biopsy when needed. 50 cases and 50 control sample were taken for the study. Psoriasis Area Severity Index was calculated for the cases and serum uric level was measured for both cases and control.


Results

The mean serum uric level in psoriatic patients was 6.16 ± 1.64 mg/dl with range of 4 to 11 mg/dl and that of control group was 5.39 ± 1.60 mg/dl with the range of 2 to 9 mg/dl. Mean serum uric acid level in psoriatic group was significantly higher than in control group with p value of 0.002 and there was positive correlation between severity of psoriasis with serum uric acid level ($p=0.001$).

Conclusion

Psoriasis was associated with hyperuricemia in psoriasis patients.

Keywords: *Hyperuricemia, Psoriasis, Serum uric acid*

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Citation

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Introduction

Psoriasis is a chronic inflammatory skin disease, characterized by sharply demarcated erythematous, scaly plaques. A wide variation in prevalence between 0.7% to 8.5% has been reported with average of 2 to 4 % among western countries [1]. Psoriasis is supposed to be initiated by interplay between genetic, environmental, and immunological factors. However, the most accepted hypothesis is that it has an immunological involvement due to its association with certain human leukocyte-associated antigens, presence of activated T lymphocytes in lesions, and its response to immunosuppressive therapies. It is associated with abnormal epidermal proliferation and rapid epidermal turn over time [2].

Besides being a skin condition, psoriasis have been linked with a number of behavioral and systemic comorbidities including metabolic syndrome and has been associated with a large impact on quality of life. Hyperuricemia is also one of the components of metabolic syndrome. Uric acid is an endogenously produced end-product of purine metabolism. A number of studies showed strong correlation among high serum uric acid (SUA) levels, insulin resistance, and metabolic syndrome, which has been suggested to develop secondary to insulin resistance [3,4].

A systemic review and meta- analysis has found the association between psoriasis and hyperuricemia [5]. A study has been done in Nepal also to find the association between serum uric acid levels in patients with psoriasis [6]. Thus, this study was done with the aim to establish the association of serum uric acid, with psoriasis and correlation with duration of disease and Psoriasis Area Severity Index (PASI).

Materials and Methods

It was a prospective case control study conducted in Department of Dermatology, Nobel Medical College teaching hospital in eastern region of Nepal over a period of one year from Jan 2020 to Dec 2022. The study was approved by Intuitional review committee on Nobel Medical College teaching hospital and then started. All the patients 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 hyperuricemia or hyperuricemia drugs and patients with known chronic diseases. i.e. Tuberculosis, liver or renal problems, excessive alcohol consump-

tion, pregnant women were excluded from study. Healthy volunteers were used as a control that came for regular health checkup in hospital. Sample size was calculated and taken using the formula, $n = [2S_p^2 [Z (1-\alpha/2) + Z (1-\beta)]^2] / \mu d^2$, $S_p^2 = [S_1^2 + S_2^2] / 2$. 50 cases and 50 control was enrolled in the study and patients were selected by nonprobability consecutive sampling.

After selection of the cases and controls, proper counseling and explanation of the procedure was done. Diagnosis of the disease was done clinically and histopathology was done when needed. 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 Uricase/ 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. Psoriasis Area Severity Index(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 obtained was entered and analysis was done using SPSS version 22. Characteristics of cases and controls were compared using the frequency and descriptive analysis. Chi-square test and Student t-test was used for comparison depending on the nature of the variable. Pearson's correlation test was used were used to see the association between the outcome and independent variables. A P value of <0.05 was considered to be statistically significant.

Results

The mean age of the cases was 47.78 ± 13.93 years with range of 20 to 81 years and that of the control was 46 ± 16.30 years with range of 21 to 74 years. In the case group there were 27 males and 23 females and in control 28 male and 22 females. The mean serum uric level in psoriatic patients was 6.16 ± 1.64 mg/dl with range of 4 to 11.8 mg/dl and that of control group was 5.39 ± 1.60 mg/dl with the range of 2 to 9 mg/dl. In psoriatic male serum uric acid was 6.90 ± 1.76 mg/dl with range of 4 to 11mg/dl and SUA level in female was 5.30 ± 0.93 mg/dl with range of 4 to 7.5mg/dl. In control group male serum acid level was 5.44 ± 1.55 mg/dl with range of 3 to 9 mg/dl and that in female was 5.15 ± 1.4 mg/dl with range of 2 to 8 mg/dl. When the mean serum uric



acid level in psoriatic group was compared with control, it was found to be significantly higher than in control group with p value of 0.02.

Table 1: Distribution of age, sex and SUA level in cases and control

	Cases (n=50)	Control (n=50)	P value
Mean age in yrs.	47.78 ± 13.93	46 ± 16.30	>0.05
Male/Female(n)	27/23	28/22	>0.05
Serum uric acid level mg/dl, mean (range)	6.16 ± 1.64 (4 -11.8)	5.39 ± 1.60 (2 - 9)	0.02

Out of 50, 14 patients with psoriasis had serum uric acid level above the reference value and 9 in control group had serum uric acid level above the reference value. When the number of individual who had hyperuricemia, serum uric acid level more than reference value, was compared between psoriatic group was compared with control it was also found to be significant, p = 0.001 as shown in table 2.

Table 2: Comparison of frequency of hyperuricemia among study group

Hyperuricemia	Cases(n=50)	Control(n=50)	p-value
Yes	14(28%)	9(18%)	0.001
No	36(72%)	41(82%)	
Total	50(100%)	50(100%)	

Chi square test

Severity of the disease was calculated using PASI score. The mean PASI score was 8.26 ± 6.62 with the range of 2 to 30. PASI score was also found to have positive correlation with serum uric acid level, with r = 0.725 and p = 0.001.

Discussion

In our study the mean age of the cases was 47.78±13.93 yrs. Syamiet al. [6] reported an age of 39.6±65 years from Nepal and Mishra et al. [7] from India reported mean age of the cases to be 36.1 years which was little lower than ours. Gisondiet al. [8] reported mean age of 51.1±10 years in Italian patients which was almost in the range of our cases. In our study there was 27 (54%) male and 23 (46%) female with male to female ratio of 1.17:1. In the study done by Syamiet al. [6] in Nepal there was 33 males and 17 females with male to female ratio of 1.17:1 and in the study done by Mishra et al. [7] in India also reported male predominance with 62.4% males. Gisondiet al. [8] in Italy reported male to female ratio of 2.8:1. So like in other studies done in inside and outside the countries male predominance was seen.

In our study mean serum uric in case was 6.16±1.64 mg/dl and that in control group was 5.39±1.60 mg/dl which was significantly higher statistically than the control group (p=0.001). In the study done by Syamiet al. [6] in Nepal it was found that 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 matching with our result. Similarly, Mishra et al. [7] also found statistically higher SUA compare to control in India and Gisondiet al. [8] also found similar significantly higher SUA levels (5.61±1.6 vs 4.87±1.4 mg/dl; P < .001).

In our study we have found that psoriatic patient had significantly high level of serum uric level, hyperuricemia, 14 in psoriasis and 9 in control which was significantly higher in psoriasis with p=0.001 compared to control group. Like our study Syamiet al. [6] in Nepal found that 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). Gisondiet al. [8] also found remarkably greater prevalence of asymptomatic hyperuricemia (19% vs 7%; P < .001) in psoriasis in compare to control. We also found that SUA has significant correlation with disease severity of psoriasis measured by PASI (r = 0.725 and p = 0.01). Similar result was obtained by Syamiet al. [6] however in the study done by Cassanoet al. [9] relation between PASI and psoriasis was not found (p=0.34).

Hyperuricemia in psoriasis patients is not fully understood. It 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. Inflammatory mediator in psoriasis, specially IL17 may cause increased production of uric acid in liver and also may be the cause for fatty liver. It may also be influenced by renal and extra renal clearance of uric acid [2]. Higher level of serum uric acid level in both case and control group may be linked to geographic variation. life style, eating habit and behavior of the people may affect the serum uric acid level. This may act as a confounding factor for the studies done in different region of the world. Studies carried out in this region had shown that serum uric acid level in the people of this region to be little bit higher [11]. Hyperuricemia appears to be a frequently associated metabolic abnormality in patients with psoriasis and may cause a number of additional



health related problems like joint pains, coronary artery disease, hypertension and renal disease [3]. As psoriasis itself is disease with chronic fluctuating course with disfigurement, associated hyperuricemia in those patients may add increase morbidity to the patient. Apart from the complication of psoriasis and the medication used in its treatment hyperuricemia has its own multigrain long term sequel. So it is recommended to do routine checkup SUA in patients of psoriasis.

Limited time frame and small sample size was our limitation. It was single center case control study and multicenter meta-analysis is needed to find the real result of the topic studied.

Conclusion

As psoriasis is associated with hyperuricemia regular checkup of serum uric acid level and treatment of hyperuricemia is to be done in psoriasis patients. This can prevent the hyperuricemia related complication in these patients earlier which can decrease the morbidity in such patients.

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Conflict of interest: None

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