Original Article

Evaluation of Serum Uric Acid Levels in Idiopathic Lichen Planus Patients

Uric Acid Levels in Lichen Planus

Hira Mughal[1], Saima Liaqat [1], Sana Khan[1], Shakeel Ahmed Sheikh[2], Hafiz Bashir Ahmed Kalhoro[1] and Muhammad Suleman Pirzado[2]

ABSTRACT

Objective: To determine mean uric acid (UA) level in patients with lichen planus (LP) presenting at the department of Dermatology, Liaquat University Hospital Hyderabad.

Study Design: Descriptive Cross-sectional study

Place and Duration of Study: This study was conducted at the department of Dermatology, Liaquat University Hospital Hyderabad from October 17, 2017 to April 16, 2018.

Materials and Methods: This study was conducted on patients who met the inclusion criteria. A total of 95 patients diagnosed with LP admitted to the medical ward were enrolled and entered the study. After taking detailed history and full clinical examination (general and local), patients were subject to relevant investigations i.e. serum uric acid level was done. Patient's height, weight, BMI, economic status and duration of disease in months was stated. From each patient 5 ml of venous blood sample was taken postprandially and sent to the institutional pathological laboratory for measuring of serum uric acid level. Each report was prepared by a consultant pathologist having at least more than 3 year of experience post fellowship.

Results: Age range in this study was from 20 to 50 years with mean age of 32.5 ± 4.47 years, mean BMI was 22.5 ± 3.47 in kg/m^2 and mean duration of disease was 37 ± 18.92 in weeks. The mean serum UA level in Patients with Idiopathic Lichen Planus was 4.32 $\pm$ 0.79mg/dL.

Conclusion: Our study results indicate that LP may be associated with the depletion of serum UA levels.UA can be considered a valuable antioxidant biomarker in LP for the development and monitoring of the treatment strategy.

Key Words: Serum Uric Acid, Lichen Planus,Intercellular Adhesion Molecule-1, Dermatology

Citation of article: Mughal H, Liaqat S, Khan S, Sheikh SA, Kalhoro HBA, Pirzado MS. Evaluation of Serum Uric Acid Levels in Idiopathic Lichen Planus Patients. Med Forum 2021;32(3):163-167.

INTRODUCTION

Lichen planus (LP) is a chronic dermatosis that may be idiopathic or associated with systemic underlying diseases, for example, hepatitis C virus. While many cases of LP are spontaneously resolved, intensive treatment is required in other cases. It is an inflammatory idiopathy of the skin and mucous membranes, characterized by autoimmune skin proliferation of T cells on the epidermis. It is still unclear, nevertheless, these auto-aggressive T cells may be triggered in-vivo to inflict epidermal damage.[1]Such cellular inflammatory infiltration, comprising primarily CD4 + lymphocytes, is a well-known reactive oxygen species (ROS) source.[2]

[1.] Department of Dermatology / Molecular Biology and Genetics[2], Liaquat University of Medical & Health Sciences Jamshoro, Sindh.

Correspondence: Hira Mughal, Department of Dermatology, Liaquat University of Medical & Health Sciences Jamshoro, Sindh
Contact No: 0342-3432441
Email: hira86mughal@gmail.com

Received: September, 2020
Accepted: November, 2020
Printed: March, 2021

Endothelial cells damage in high concentrations of ROS, and more up regulated and expressed intercellular adhesion molecule ICAM 1. At the site of inflammation, T lymphocytes are recruited by this expression of ICAM-1. This process may cause perivascular infiltration of T-cell and exocytosis of lymphocytes is observed in LP.[3]It is characterized by flat papules polygonal in shape and plaques with severe pruritis. Lesions in the skin may disfigure and implication of oral mucosa or genital mucosa may be harmful in severe cases. Although most lichen planus cases are idiopathic, but it has been found that some cases may result from the ingestion of certain medicines for example, pencillamine, antimalarial agents, gold, penicillamine, beta- blockers, thiazide diuretics, NSAIDs, enzyme-inhibiting quinidine and angiotensin. Localized lichen planus patients are usually treated with highly potent topical steroids, while systemic steroids are used in general lichen planus patients.[4]The exact occurrence of the LP is unknown. Nevertheless, the approximate prevalence of LP is between 0.22% and 5% worldwide.[5] Uric acid is the result of primary degradation of human purine catabolism. Most uric acid is produced by the liver and intestinal mucosa.[6]Uric acid, vitamin C and some enzymes are included as primary defense mechanism against oxidative stress.[7] Uric acid is considered to be an important antioxidant

in plasma and can scavenge ROS and can chelate metal ions.[8,9]

In year 2014, Chakraborti B, et al showed in his case control study that in the sample test of uric acid level of patients and controls, mean serum uric acid level 0.345mg/dL and it was found that the difference was significant ($p < 0.001$)and correlation between disease duration and serum uric acid level shown significant decrease (difference) in uric acid level with increasing duration of the disease ($p <0.003$).[10] In this study, mean uric acid level in patients with lichen planus was 4.48 ± 0.99mg/dL.[11]

The rationale of this study was to evaluate the uric acid levels in lichen planus patients as uric acid has a protective role in lichen planus, variations in its level can affect the outcome of the disease. Therefore, it was important to recognize these patients, due to the significant prognostic implications. The research will raise understanding and, with regard to its management strategy, the coexistence of uric acid with lichen planus affects health practitioners. It could also help to check the progress the disease by detecting it early in its course of development. The objective of the present study therefore was to determine the level of UA in LP patients presented at Department of Dermatology, Liaquat University Hospital Hyderabad.

MATERIALS AND METHODS

Descriptive Cross-sectional study was carried out at the department of dermatology, Liaquat University of Medical &Health Sciences, Civil Hospital Hyderabad from October 17, 2017 to April 16, 2018. Sample size was computed with the calculator for the WHO sample size. Mean and standard deviation of UA level in LP patients taking 4.48 ± 0.99mg/dL(12), margin of error = 0.20 at 95% confidence interval. The calculated sample size was 95 patients of lichen planus. Non- probability, consecutive sampling technique was applied. ethical review committee. The inclusion criteria was known n=95 (confirmed) cases of Lichen Planus, both genders, patients 20 to 50 years of age and duration of disease from one week after eruption of lesion to 18 months. The exclusion criteria was smoker for >1 year and smoking more than 1 pack per day (detected by history), those patients on steroid or immune-suppression drugs or NSAIDs for last one month, gout (clinical and medical assessment), obesity (BMI> 27), chronic kidney disease (history, clinical and medical record), Pregnancy (history, clinical and medical assessment) and UA lowering drugs and who refused to give consent. After taking detailed history and full clinical examination (general and local), patients were subject to relevant investigations i.e. the patient's height, weight, BMI, economic status and duration of disease in months was stated. From each patient 5 ml of venous blood sample was taken post prandially and sent to the institutional pathological laboratory for measuring of serum uric acid level. Each report was prepared by a consultant pathologist having at least more than 3 year of experience post fellowship. A written consent was taken from all patients for participation in the study and the data was collected on pre-designed proforma. The data was entered in Statistical Package for Social Sciences (SSPS) IBM Version.22 for data analysis. Frequencies and percentage of qualitative data such as gender, educational and socioeconomic status was presented as n (%). Numerical data like age (in years), BMI, serum uric acid level and duration of disease was presented as Mean± Standard Deviation. Effect modifiers were controlled by stratification of age, BMI, gender, economic status, educational status and duration of lichen planus to see the effect of these on MEAN of serum uric acid level by using T- test/ANOVA. All the data were calculated at a confidence interval of 95%. A p- value ≤ 0.05 was considered as statistically significant.

RESULTS

The age range in this analysis was between 20 and 50 years and the mean age was 32.5 ± 4.47 years, mean BMI was 22.5 ± 3.47 in kg/m^2 and mean duration of disease was 37 ± 18.92 in weeks. Sixty two(66.6%) of the 95 patients were male and 32 (30.3%) were female.

A total of 95 patients were enrolled, 19 (20%) of whom were uneducated, 28 (29.2%) had primary education, 17 (17.7%) had secondary education, 16 (17%) had higher secondary education, 11 (12%) graduated and 04(4.1%) were post graduate.

Twenty three (24.12%) had income <Rs. 10,000/=, 40 (42.11%) had income Rs. 10,000 to 25, 000/= and 32 (33.72%) had income >Rs. 25000/=.

The mean serum level of uric acid in Idiopathic Lichen Planus patients was 4.32 ± 0.79mg/dL.

Table No.1. Mean serum uric acid level stratification in age-related patients with idiopathic lichen planus.

Serum Uric Acid Level	Age		P-Value
	20-35 (n=57)	35-50 (n=38)	
Mean ± SD	4.49 ±0.1	3.39 ±0.07	< 0.001

Table No.2: Mean serum uric acid level stratification in gender-specific patients with idiopathic lichen planus.

Serum Uric Acid Level	Gender		P-Value
	Male (n=63)	Female (n=62)	
Mean ± SD	4.09 ±0.31	4.2±0.7	0.2569

When the outcome variable was stratified with respect to age, duration of disease and income status, significant difference was observed, shown in table 1.

Similarly, when outcome variable was stratified with respect to BMI, educational status and gender, no significant difference was observed, Shown in table 2, 3, 4 and 5.

Table No.3: Stratification of the level of Mean Serum Uric Acid in weeks of disease duration in patients with Idiopathic Lichen Planus.

Serum Uric Acid Level	Duration of Disease		P-Value
	1-40 (n=59)	➢ 40- 72 (n=36)	
Mean ± SD	4.20± 0.1	4.01 ± 0.2	< 0.001

Table No.4. Stratification of the mean serum uric acid level in patients with idiopathic lichen planus in terms of educational status.

Serum Uric Acid Level	Educational Status						P-Value
	Uneducated (n=19)	Primary (n=28)	Secondary (n=17)	Higher secondary (n=16)	graduated (n=11)	Post graduate (n=04)	
Mean ± SD	4.09 ± 0.9	4.2± 0.1	4.1± 0.11	4.39 ± 0.7	4.01 ± 0.02	4.01 ± 0.1	0.367

Table No.5. Stratification of the level of Mean Serum Uric Acid in Idiopathic Lichen Planus Patients with respect to BMI.

Serum Uric Acid Level	BMI		P-Value
	18-25 (n=69)	>25 to <27 (n=32)	
Mean ± SD	4.30±0.8	4.19 ±0.1	0.441

DISCUSSION

Lichen planus is a chronic inflammatory disorder involving the skin. The pathophysiology is complex and is microscopically examined and the features of LP are similar to the pathognomonic features of interphase dermatitis. Cell degeneration due to the epithelial permeation of the T-lymphocyte helps to produce local cytokines.[5] In addition, anomalies that have been reported in free radical rates and ROS with antioxidant may play a major role at the beginning of several inflammatory diseases.[12]Reactive oxygen species in the tissues could result in oxidative damage that may culminate in lack of antioxidant levels. The skin has a number of defense mechanisms to prevent their deleterious effect.[13]UA is a natural end product of purine metabolic pathway in mammalian systems. Xanthine oxidase catalyzes the last two steps in the production of uric acid and this enzyme belongs to the very first class of enzyme classification by International Union of Biochemistry and Molecular Biology (IUBM). Oxidation reactions are always coupled with reduction within living systems[14]. Molecular oxygen is used during these reactions with production of reactive oxygen products are generated as electron acceptors. There are evidence that higher serum uric acid levels are a risk factor for development of cardiovascular diseases where oxidative stress plays a major role in pathophysiology.[15]A protective effect on oxidative stress conditions is allopurinol, a xanthine oxidoreductase inhibitor that decreases uric acid levels in serums.[16]This pollutes free radicals by inhibiting endothelial function under oxidative stress conditions inside a cell that discharges glutathione. There is emerging evidence that the UA has an in vitro impact as antioxidant and antioxidant plasma potential increases with UA administration.[17]

Our analysis showed a significant reduction in serum UA levels in patients, i.e. 4.32±0.79 mg/dL. This study was related to Chakraborti et al, medium serum UA, 3.6 mg/dL in patients and 3.94 mg/dL controls .[10]The mean difference is 0.34 mg/dL. There was also a significant decrease in UA levels in the sample of Italian LP patients.[18] On the contrary, Israel's report found that hyperuricemia was more common than the general population, although LP was not found to be a source of overproduction of uric acid.[19]Saawarnet al[20] stated that oral LP can play a role in oxidative stress, meanwhile, the strong antioxidant lycopene was found to be effective in another study in the oral LP's management. This therapeutic effect shows indirectly oxidative stress's function in LP pathogenesis.[21]

This study demonstrate a significant correlation with serum UA levels between age of the patient and duration of the disease. However no significant gender and BMI relationship with serum UA was identified. Compared to other studies, there is no significant correlation between age and gender with serum UA in one study[10]. Although a significant association between UA disease period was found similar to this research.[10]

Indirect evidence of increased oxidative stress in LP is confirmed by the fact that saliva UA is decreased in oral LP patients.[22]In addition, vitamin E and C levels in LP are decreased and supplementation of these may play a role in the management of LP.[23]

So far from the studies it has been concluded that damage induced by the free radical is one of the contributing factors in pathogenesis of LP, it has therefore been proposed that the targeted treatment protocols must contain adequate antioxidant protection. Exploiting the antioxidant properties of UA, a study using two methodologically distint assays demonstrated an enough evidence that administrating UA systematically could improve ex-vivo serum free radical scavenging to a much extent than ascorbic acid

which is also considered to be an effective antioxidant within the living systems[24].

CONCLUSION

Our study results show that LP can be correlated with UA serum depletion. UA can be taken into consideration as a useful antioxidant biomarker in patients with LP for the production and monitoring of treatment strategies. Our study limitation is that there's no control group. To conclude more accurately, further research should be performed with the control group and larger sample size.

Author's Contribution:

Concept & Design of Study:	Hira Mughal
Drafting:	Saima Liaqat, Sana Khan
Data Analysis:	Shakeel Ahmed Sheikh, Hafiz Bashir Ahmed Kalhoro, Muhammad Suleman Pirzado
Revisiting Critically:	Hira Mughal, Saima Liaqat
Final Approval of version:	Hira Mughal

Conflict of Interest: The study has no conflict of interest to declare by any author.

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