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Original Article

Comparison of Serum Uric Acid Concentrations in Patients with Lichen Planus and other Dermatoses

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Abstract

Background: Lichen planus (LP) is an autoimmune inflammatory disease of the mucocutaneous tissue, whose exact pathogenesis is not yet understood. Uric Acid (UA) is one of the important antioxidants in plasma which can scavenge reactive oxygen species (ROS). This study aimed to compare the serum uric acid (UA) levels in lichen planus patients with other dermatoses. **Materials and Methods:** This cross sectional comparative study was conducted among purposively selected 70 patients at the Department of Dermatology and Venereology of Bangabandhu Sheikh Mujib Medical University, Dhaka from December 2016 to January 2018 where 35 patients with LP and the rest of 35 patients with other skin disease were enrolled as case and control respectively in the study. All the patients diagnosed clinically and histopathologically were included in the study after fulfilling the criteria. The statistical analysis was done by using the Statistical Package for Social Sciences (SPSS) Windows version 22. Descriptive and inferential analysis was carried out for categorical and numerical data. **Results:** The mean age of patients with lichen planus and other dermatoses was 37.80±14.92 years and 33.60±9.61 years, respectively. The most common types of LP were classical 18(51.4%).The mean serum UA levels in patients with lichen planus and other dermatoses were 4.09±1.07 and 5.63±1.28 mg/dl, respectively and the difference between the mean of the two groups was 1.537 mg/dl ($p<0.005$). There was a significant negative correlation with duration of disease (months) and uric acid where Correlation-Coefficient or 'r'-value was +0.448 ($p=0.007$). **Conclusion:** Serum uric acid level is lower in lichen planus patients compare to that of other dermatoses. Serum uric acid level is negatively correlated with duration of the disease in lichen planus patients.

Key words: Lichen planus, Reactive oxygen species, Uric acid, Dermatoses, Anti-oxidant

Introduction

Lichen planus (LP) is a sub-acute to chronic, inflammatory, papulosquamous disorder characterized by typical lesions.[1] LP is a very common disorder with 0.2-1% prevalence worldwide. Outpatients in the dermatology domain account for about 0.38% of cases of LP. Regardless of gender and caste, it is commonly seen in the population aged 30-70 years.[2] The cause of LP is still under the microscope, but it is assumed that it is mainly due to an overreaction of the skin's immune/defense system. Although the exact pathogenesis is unknown, works of the literature suggest that cell-mediated immunity and humoral immunity are involved in the development of LP.

Activation of the cell-mediated immune response constitutes three processes such as LP-specific antigen recognition, cytotoxic lymphocyte activation, and keratinocyte apoptosis which are considered as the prime event in the pathogenesis of LP.[3, 4] Recently, it has been suggested that free radicals play an important role in the underlying mechanism of various skin diseases, including LP. In addition, oxidative stress which refers to a condition where an increased reactive oxygen species (ROS) production overwhelms the antioxidant defense mechanisms can promote local tissue damage.[5] Oxidative stress is involved in the pathogenesis of many skin diseases such as melanoma

and non-melanoma skin cancers [6], psoriasis [7], vitiligo [8], and chronic urticarial[9] and Behcet‟s disease [10]. Along with these, study report that oxidative stress may have a role to play in the pathogenesis of lichen planus.[11] Uric acid (UA) is a powerful free radical scavenger and is thought to contribute >50% of the antioxidant capacity of blood [12, 13] which means it acts as a defense against oxidative stress like other antioxidants such as enzymes, vitamins etc. Many studies have revealed the antioxidant role of UA in other dermatological conditions like LP. [14, 15, 16].

There is controversy about the concentration of UA in the patients of LP. Some study illustrates a higher concentration of UA in the LP population.[17] While others observe a decreased level of UA.[18] However, serum UA levels are decreased with increasing duration of LP disease and the duration of disease may have greater impact on oxidative damage in comparison with age of the patients. Oxidative insult has a role to play in the etio-pathogenesis of LP. The rational strengthening of the antioxidant defenses by the addition of antioxidants should be part of an optimal treatment strategy for such patients.[19] LP is associated with decrease of UA levels in serum suggesting increased oxidative stress, which may be addressed in treatment schedule. UA may be considered as a useful biomarker of antioxidant status in LP for elaboration of treatment strategy and monitoring. Thus, this study attempted to investigate the concentration of uric acid in LP and other skin diseases and looked at the relationship between participants' socio-demographic profiles and the diseases to better understand the concentration of uric acid in LP and other skin diseases.

Materials and Methods

This cross-sectional comparative study was conducted for one year at the Department of Dermatology and Venereology, Bangabandhu Sheikh Mujib Medical University (BSMMU) Dhaka from December 2016 to January 2018. The patients of Lichen Planus and other dermatoses such as tinea, wart, prurigo, scabies, paronychia, nevus, P versicolor, xerosis, lentigo simplex, and melasma were recruited purposively from the outdoor of Department of Dermatology and Venereology, BSMMU. Participants diagnosed with Lichen Planus and other dermotoses were considered as case and control group of this study, respectively. The total sample size of the study was 70 which were obtained by using a validated equation. Each group case and control had contained 35 participants. Regardless of gender, the confirmed cases of LP whose ages were above 18 years and gave written consent were included as the participants of the case group of study. On the other hand, patients of both sexes over 18 years of age, such as tinea, wart, prurigo, scabies, paronychia, nevus, P versicolor, xerosis, lentigo simplex, and melasma(except LP), willing to participate in the study were considered as respondents in the control group.

All the patients, diagnosed by expert dermatologists, were included in the study after fulfilling the inclusion criteria which was confirmed by taking the proper history, examination, and necessary laboratory tests. Patients of lichen planus attending in outdoor of Dept. of Dermatology and Venereology, BSMMU were thoroughly evaluated by taking a complete history (skin rash, itching, duration of disease, oral ulceration, nail change,) and physical examination (distribution and character of papule, oral mucosa, nail, hair, height, weight, body mass index (BMI). The diagnosis of LP was based on clinical finding (flat topped, polygonal papule, characteristic nail change, oral mucosal involvement, keratotic follicular papule etc) and confirmed by skin biopsy for histopathology. In a very similar way, the data were collected from the control group of the study. All samples were coded and assayed in a blind fashion by an investigator who was unaware of the subjects‟ clinical status. Serum UA was assayed using auto analyzer, by uricase method. The normal value for serum uric acid level of study population is 3.5-7.2 mg/dl for male and 2.6-6.0 mg/dl) for female [20].

Both descriptive and inferential statistics was used for data analysis. In this case, the Statistical Package for Social Sciences Windows version 22.0 was administered. Categorical variables of this study were expressed as percentage and numerical variables were

expressed as mean ± standard deviation. Unpaired t-test and Chi square test was used to compare serum uric level in lichen planus patients and other dermatoses. P values <0.05 was considered as statistically significant. Prior to study, necessary ethical permission was sought from the Institutional Review Board and concerned authority of BSMMU.

Results

The total number of participants was 70 (Table 1). Of these, 35 were in the case group and the remaining 35 were in the control group. The mean age for case group and control group was 37.80±14.92 and 33.60±9.61 years, respectively. No statistically significant mean age difference was found between the two groups (p>0.05). Among the case group, the highest percentage (40.0%) had an age of 21-30 years, whereas among the control group highest percentage (42.9%) had an age of 31-40 years. In terms of gender, both the case and the control group had 48.6% males and 51.4% females among their total respondents. No significant difference was observed in male and female (p>0.05) between the two groups. Most patients had normal weight in both the case (62.9%) and the control group (57.1%). No significant difference of BMI was found between the two groups. In the case of occupational status of the study participants, majority of the patients were housewife 42.9% in the case group and 42.9% of patients was service holder in the control group. Occupational status had no statistically significant difference between two groups (p>0.05). It has found that about 11.4% patients had diabetes mellitus in each group. In the case group, there were 11.4% smokers while the control group had contained 8.6% of smokers.

Table I: Socio-demographic, BMI, Diabetes and smoking habit status of participants (N=70)

	Variables	Case (n=35)		Control(n=35)		P value
		n	%	n	%	
Age	≤20	2	5.7	3	8.6	0.166^{ns}
	21-30	14	40.0	11	31.4	
	31-40	4	11.4	15	42.9	
	41-50	7	20.0	4	11.4	
	>50	8	22.9	2	5.7	
	Mean Age	37.80±14.92		33.60±9.61		
	Range	(18-68) years		(18-58) years		
Gender	Male	17	48.6	17	48.6	1.000
	Female	18	51.4	18	51.4	
BMI	Underweight (<18.5)	3	8.6	1	2.9	0.594
	Normal weight (18.5 -24.9)	22	62.9	20	57.1	
	Over weight (25.0 -29.9)	8	22.8	12	34.3	
	Obese (>30.0)	2	5.7	2	5.7	
Occupation	Housewife	15	42.9	11	31.4	0.228
	Service Holders	7	20.0	15	42.9	
	Businessman	2	5.7	1	2.9	
	Others	11	31.4	8	22.9	
Diabetes	Present	4	11.4	4	11.4	1.000
	Absent	31	88.6	31	88.6	
Smoking Habit	Yes	4	11.4	3	8.6	0.690
	No	31	88.6	32	91.4	

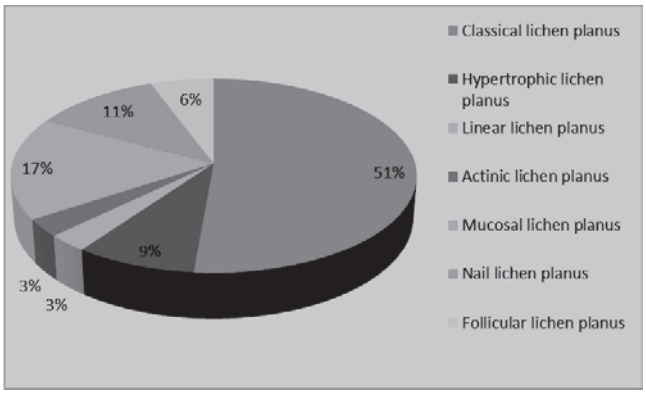

Figure 1: Percentage of study partcipants according to clinical types of Lichen Planus

Figure 1 shows the percentage of different types of LP patients participating in the study as subjects of the case group. The majority of the subjects were belonging to the classical lichen planus 18(51.4%), followed by mucosal lichen planus 6(17.1%), nail lichen planus 4(11.4%), hypertrophic 3(8.6%), follicular lichen planus 2(5.7%), linear lichen planus 1 (3%) and actinic lichen planus 1(3%).

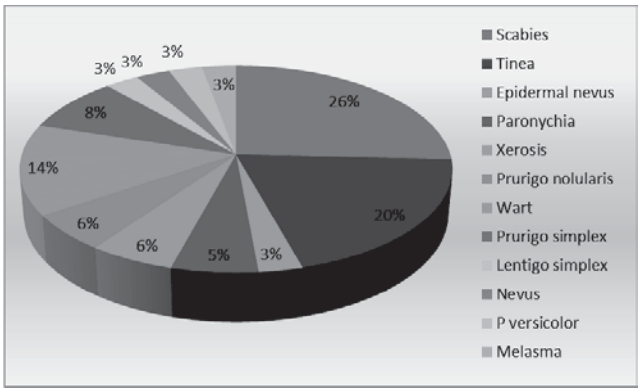

Figure 2: Participants percentage on the basis of other dermatoses

Figure 2 illustrates the other dermatitis which was found among the participants of control group. Of these, approximately 26% respondents had scabies. Furthermore, 20.0%, 14%, 8%, 6%,6%, 5%,3%,3%,3%,3% and 3% had Tinea ,Wart, Pruigo simplex, Prurigo nolularis, Xerosis, Nevus, Paronychia, Lentigo simplex, Epidermal nevus, P versicolor, and Melasma, respectively.

The mean serum UA levels in the case and controls were 4.09±1.07 and 5.63±1.28 mg/dl, respectively and the difference between the mean of the two groups was 1.537 mg/dl Table-II. This difference is highly significant ($p<0.05$). Table-IV showed 17(48.6%) patients within the level of uric acid (mg/dl) 1.5-40, 18(51.4%) within the range of uric acid 4.0-6.0mg/dl in the case group. In other dermatitis group, 20(57.1%) patients had uric acid level of 4.0-6.0 mg/dl and 13(37.1%) patients had uric acid level more than 6 mg/dl. There is significance difference between the two groups.

Table-II: Distribution of the subjects by serum uric acid level (n=70)

Serum Uric Acid Level (mg/dl)	Lichen Planus		Other dermatoses		P value
	n (35)	%	n (35)	%	
1.5–4.0	17	48.6	.2	5.7	<0.001
4.0–6.0	18	51.4	20	57.1	
> 6.0	0	0.0	13	37.1	
Mean±SD	4.09±1.07		5.63±1.28		

The comparison of paired data of duration of LP and serum UA level for each patient shows significant decrease (difference) in UA levels with increasing duration of the disease (Figure 3). Significant negative correlation was observed between the duration of disease (months) and serum uric level (mg/dl), where Correlation – Coefficient or 'r'- value was +0.448 (p=0.007). This means there is moderately negative correlation between mean uric acid with duration of disease (months) and the relationship is statistically significant.

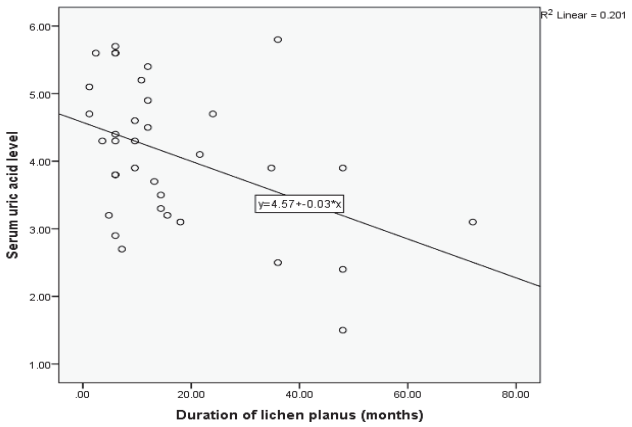

Figure-3: Scatter diagram showing the correlation of serum uric acid with duration of lichen planus (months).

Discussion

A prior study reported that Lichen planus usually appears primarily after the age of 20 years and peaks between 40 and 70 years.[21] In the present study, the most commonly affected age group were 20-30 years (40.0%) for lichen planus and 31-40 years (42.9%) for other dermatoses. On the other hand, it was found that the mean age of patients with lichen planus was 37.80±14.92 years ranging from 18 to 68 years and patients with other dermatoses were 33.60±9.61 years ranging from 18 to 58 years. This finding is consistent with the previous studies carried out particularly for the patients with LP.[22, 23] The prevalence of LP in this study was found to be higher among women that support the results of a prior study.[21] A research investigated that there are eight morphological types of lichen planus including Classical Lichen Planus, Hypertrophic Lichen Planus, Atrophic Lichen Planus, Vesiculobullous Lichen Planus, Ulcerative Lichen Planus, Follicular Lichen Planus, Lichen Planus Pigmentosus and Actinic Lichen Planus.[3] Of these, classical type is most common[24 ,] which is similar to our research finding in this regard.

Evidence suggests the presence of varied uric acid concentration in the patients of LP and other dermatological diseases.[1, 25-27] In present study, the mean serum uric acid levels in patients with lichen planus were 4.09±1.07 mg/dl which is significantly lower than other dermatoses (5.63±1.28 mg/dl). The difference of mean between the two groups was 1.537 mg/dl which is also highly significant ($p<0.05$). Gupta et al. (2017) revealed that there was a significant difference in mean uric acid levels between the patients with lichen planus and control group[2.] The mean serum uric acid level was significantly increased after remission in LP patients aged <35 years as well as those aged >35 years. Chakraborti et al. (2014) showed serum uric acid levels were significantly decreased in patients with lichen planus in respect to other dermatoses and the mean serum uric acid levels in patients with lichen planus and other dermatoses were 3.6 and 3.94 mg/dl, respectively where the difference of means is 0.34 mg/dl[1.] Similalrly, Sree et al. (2018) reported serum UA levels were significantly decreased in patients with lichen planus with respect to controls 3.1±0.91 and 4.9±1.08 mg/dl respectively.[28] The difference of means is 1.8 mg/dl, which is consistent with present study. These results point towards a pathological relation of decreased uric acid levels with LP and its duration, which are correlates with the present study.

In present study the comparison of paired data of duration of LP and serum uric acid level for each patient shows significant decrease (difference) in uric acid levels with increasing duration of the disease. Significant negative correlation was observed between the duration of disease (months) and serum uric acid level (mg/dl), where Correlation – Coefficient or 'r'-value was +0.448 ($p=0.007$). This means there is moderately negative correlation between serum level of uric acid and duration of disease (months). A previous research showed significant correlation between the serum uric acid levels and duration of disease.[1] A significant decrease of uric acid levels was also observed in study of LP patients from Italy.[29] On the contrary, a report from Israel found higher prevalence of hyperuricemia than that of general population[17,] though LP was not considered as a cause of overproduction of uric acid on that study. Thus, this result point towards a pathological relation of decreased uric acid levels with LP and its duration.

Conclusion

From the result of the study it may be concluded that serum uric acid level is lower in lichen planus patients compare to that of other dermatoses. Serum uric acid level is negatively correlated with duration of the disease in lichen planus patients

References

1. Chakraborti, G, Biswas, R, Chakraborti, S. and Sen, P.K. (2014). Altered Serum Uric Acid Level in Lichen Planus Patients. Indian J Dermatol 59(6): 558–561.
2. Gupta, A., Mohan, R.P.S., Gupta, S., Malik, S.S., Goel, S. and Kamarthi, N. (2017).Roles of serum uric acid, prolactin levels, and psychosocial

factors in oral lichen planus. Journal of oral science, 59(1):139-146.

3. Daoud, M.S. and Pittelkow, M.R. (2003). Lichen planus. In: Irwin, M.F., Eisen, A.Z., Wolff, K., Austen, K.F., Goldsmith, L.A., Katz, S.I. (Eds.), Fitzpatrick‟s Dermatology in General Medicine, sixth ed. McGraw-Hill, New York, pp. 463–477.
4. Middel, P., Lippert, U. and Hummel, K.M. (2000). Expression of lymphotoxin-alpha by keratinocytes: a further mediator for the lichenoid reaction. Pathobiology 68: 291–300.
5. Hendel, A., Hiebert, P.R., Boivin, W.A., Williams, S.J. and Granville, D.J. (2010). Granzymes in age-related cardiovascular and pulmonary diseases. Cell Death Differ 17: 596–606.
6. Sander, C.S., Ali, I., Dean, D., Thiele, J.J. & Wojanarowaka, F. (2004). Oxidative stress is implicated in the pathogenesis of lichen sclerosis. Br J Dermatol 151: 627–35.
7. Briganti, S. and Picardo, M. (2003), Antioxidant activity, lipid peroxidation and skin diseases. What's new. Journal of the European Academy of Dermatology and Venereology, 17: 663-669. doi:10.1046/j.1468-3083.2003.00751.x
8. Spencer, J.D., Gibbons, N.C.J., Rokos, H., Peters, E.M. Wood, J.M. & Schallreuter, K.U. (2007). Oxidative stress via hydrogen peroxide affects proopiomelanocortin peptides directly in the epidermis of patients with vitiligo. J. Invest. Dermatol 127: 411–420.
9. Okayama, Y. (2005). Oxidative stress in allergic and inflammatory skin diseases. Curr. Drug Targets: Inflamm. Allergy 4: 517–519.
10. Buldanlioglu, S., Turkmen, S., Ayabakan, H.B., Yenice, N., Vardar, M., Dogan, S. et al. (2005). Nitric oxide, lipid peroxidation and antioxidant defence system in patients with active or inactive Behcet‟s disease. J. Dermatol 153: 526–530.
11. Sezer, E., Ozugurlu, F., Ozyurt, H., Sahin, S. & Etikan, I. (2007). Lipid peroxidation and antioxidant status in lichen planus. Clin. Exp. Dermatol 32: 430–434.
12. Venkateshappa, C., Harish, G., Mahadevan, A., Srinivas Bharath, M.M. & Shankar, S.K. (2012). Elevated oxidative stress and decreased antioxidant function in the human hippocampus and frontal cortex with increasing age: Implications for Neurodegeneration in Alzheimer's Disease. Neurochem Res 37: 1601–14.
13. Frei, B., Birlouez-Aragon, I. and Lykkesfeldt, J. (2012). Authors‟ Perspective: What is the optimum intake of vitamin C in humans? Crit Rev Food Sci Nutr 52: 815–29.
14. Pacher, P., Beckman, J.S. & Liaudet, L. (2007). Nitric oxide and peroxynitrite in health and disease. Physiol Rev 87: 315–424.
15. Waring, W.S., McKnight, J.A., Webb, D.J. & Maxwell, S.R. (2006). Uric acid restores endothelial function in patients with type 1 diabetes and regular smokers. Diabetes 55: 3127–32.
16. Hooper, D.C., Scott, G.S., Zborek, A., Mikheeva, T., Kean, R.B., Koprowski, H. et al. (2000). Uric acid, a peroxynitrite scavenger, inhibits CNS inflammation, blood-CNS barrier permeability changes, and tissue damage in a mouse model of multiple sclerosis. FASEB 14: 691–8.
17. Shai, A. and Halevy, S. (1992). Lichen planus and lichen planus-like eruptions: Pathogenesis and associated diseases. Int J Dermatol 31: 379–84
18. Battino, M., Greabu, M., Totan, A., Bullon, P., Bucur, A., Tovaru, S. et al. (2008). Oxidative stress markers in oral lichen planus. Biofactors 33: 301–10.
19. Rai, B., Khar, S., Jain, R. and Anand, S.C. (2008). Salivary vitamin E and C in lichen planus. Gomal J Med Sci 6: 91–2.
20. Desideri G, Castaldo G, Lombardi A, Mussap M, Testa A, Pontremoli R, Punzi L, Borghi C., Is it time to revise the normal range of serum uric acid levels? (2014)
21. Arnold, H.L., Odom, R.B. and James, W.D., 1990. Andrews' diseases of the skin: clinical dermatology. WB Saunders Company.

22. Fellner MJ (1980). Lichen planus. Int J Dermatol 19:71-75

23. Halevy S., Feuerman EJ (1983). Urolithiasis in lichen planus (letter). Arch Dermatol 119:364

24. Khondker, L., Wahab, M.A. and Khan, S.I., 2010. Profile of lichen planus in Bangladesh. Mymensingh medical journal: MMJ, 19(2), pp.250-253.

25. Yilmaz, E., Tamer, E., ARTÜZ, R.F., ÇAKMAK, S.K. and KÖKTÜRK, F., 2017. Evaluation of serum uric acid levels in psoriasis vulgaris. Turkish journal of medical sciences, 47(2), pp.531-534.

26. Morato-Conceicao, Y.T., Alves-Junior, E.R., Arruda, T.A., Lopes, J.C. and Fontes, C.J., 2016. Serum uric acid levels during leprosy reaction episodes. PeerJ, 4, p.e1799.

27. Li, W.C., Mo, L.J., Shi, X., Lin, Z.Y., Li, Y.Y., Yang, Z., Wu, C.L., Li, X.H., Luo, Y.Z., Qin, L.Q. and Mo, W.N., 2017. Antioxidant status of serum bilirubin, uric acid and albumin in pemphigus vulgaris. Clinical and experimental dermatology.

28. Sree, J.V. and Kumar, V.A., 2018. Study of serum uric acid levels in lichen planus. International Journal of Research in Dermatology, 4(1), pp.38-40.

29. Battino, M., Greabu, M., Totan, A., Bullon, P., Bucur, A., Tovaru, S. et al. (2008). Oxidative stress markers in oral lichen planus. Biofactors 33: 301–10.

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