Original Article

Frequency of Dyslipidemia in Patients with Lichen Planus: A Comparative Cross-Sectional Study

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ABSTRACT

OBJECTIVE: To determine the relationship between lichen planus (LP) and dyslipidemia.
METHODOLOGY: It was a comparative cross-sectional study conducted at the department of dermatology, Liaquat University of Medical & Health Sciences, Hyderabad, from October 2016 to April 2017. The study included both genders aged 20 to 50, including all patients with cutaneous lichen planus of more than one month. Each patient's blood sample (after 8 hours of fasting) was collected and sent to the LUMHS diagnostic and research laboratory for lipid profile (elevated total cholesterol higher than 200mg/dL and elevated LDL-C higher than 130mg/dL in LP patients). Where a consultant pathologist prepared each report (at least three years of post-fellowship experience), and the presence or absence of dyslipidemia was noted. All of these data were recorded on a specially designed pro forma.
RESULTS: Mean age was 31.23±7.27 years. Out of 100 patients, 51 (51.0%) were male and 49 (49.0%) were females with a ratio of 1:1 between males and females. dyslipidemia in A-group was seen in 35 (70.0%) patients while in B-group was seen in 18 (36.0%) patients (p-value = 0.001 and odds ratio = 4.1481).
CONCLUSION: This study concluded that the frequency of dyslipidemia is higher in lichen planus patients compared to healthy individuals.

KEYWORDS: Lichen Planus, Cholesterol, Dyslipidemia, Dermatology

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INTRODUCTION

Lichen planus (LP) is an autoimmune disease of chronic inflammation that affects the face, mouth, genital mucosa, scalp and nails. Six P's (planar, purple, polygonal, pruritus, papules and plaques) are used to identify LP lesions. Generally, the presentation is acute, and the flexor surfaces of wrists, forearms and legs are affected. Often the lesions show lacy, reticular, white lines called Wickham striae[1]. The exact cause of LP is not very clearly understood. It was found to be an immunologically mediated disease, and some triggers are clinically found to be responsible for it. There are obvious links with the facts, such as drugs, stress, environmental allergens, food allergens and systemic illness.

Dyslipidemias are disorders of lipoprotein metabolism, including the overproduction and deficiency of lipoproteins. Many dermatological disorders are known to be associated with dyslipidemia. Most of these are chronic inflammatory diseases, and the underlying mechanism may involve the secretion of pro-inflammatory cytokines. Studies have shown an increased frequency of dyslipidemia in skin disorders such as psoriasis, lichen planus, pemphigus, granuloma annulare, histiocytosis, and connective tissue disorders such as lupus erythematosus. It was established that lichen planus was associated with dyslipidemia[2,3]. Chronic inflammation can explain the association with dyslipidemia in patients with lichen planus. Studies have reported that individuals with lichen planus have significantly higher levels of various lipids compared to the control group[4]. Santiago AS et al.[11] revealed the higher dyslipidemia prevalence in lichen planus patients relative to the cases group, i.e. 61.3% vs 32.5%.

Epidermal cells in LP have demonstrated enzyme defects as well as impaired expression of the carbohydrate. Among patients living with LP, there was an increased incidence of diabetes and resistance to carbohydrates, indicating their possible role in the pathogenesis[4]. Oral LP was also diabetes-related[5,6]. However, not all research found similar results: the prevalence of systemic diseases such as hypertension (21%), arthritis (14%) and diabetes (5%) was not higher than projected in the general population in a single report[7]. Very few studies investigated the connection between LP and dyslipidemia to our knowledge.

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It may help screen lipid levels in men or women with lichen planus in detecting people at risk to launch preventive therapy against cardiovascular disease[2,8]. The study's objective was to determine the relationship of lichen planus (LP) with dyslipidemia. The rationale for this study was to assess the association between lichen planus and dyslipidemia in our local population. Although its association was already known, very few local studies on this subject have been found in our setting; this study will provide local statistics on the problem and be a valuable addition to existing literature. Also, based on these results, the high-risk patients can be given special attention. A proper screening protocol can be designed to screen lipid levels in lichen planus patients, which will help the clinicians make many concrete considerations in our guidelines for routine practice, treating dyslipidemia in these particular patients to reduce their morbidity and cardiovascular diseases.

METHODOLOGY

It was a comparative cross-sectional study conducted at the department of dermatology, Liaquat University of Medical & Health Sciences, Hyderabad, from October 2016 to April 2017. The calculated sample size was 100, i.e. 50 in each group with a 95% confidence level, 80% power of the study, taking a percentage of dyslipidemia in the A-group as 61.3% and in the B-group as 32.5%.[9] Non-probability, consecutive sampling was used. The ethical approval was taken from the College of Physicians & Surgeons of Pakistan. All patients with cutaneous lichen planus of more than one-month duration, both genders aged between 20-50 years were included in the study.

The exclusion criteria for the study were patients with oral lichen planus (lichen planus in the oral cavity), pregnancy and lactation (urine pregnancy test for women of childbearing age), patients with psoriasis (assessed on clinical examination, i.e. chronic erythematous scaly plaques (raised areas of inflamed skin covered with silvery-white scaly skin), hepatitis and chronic liver disease (assessed on history and s/ bilirubin higher than 1.0mg/dL), renal disease (renal function test, creatinine higher than 1.1mg/dL), the lichenoid reaction caused by some drug or dental amalgam (history of drug intake before the appearance of lesion or any dental procedure) and patients not willing to be included in the study.

Written informed consent from the patients was obtained. Fifty subjects who were presented to the department of dermatology, Liaquat University of Medical & Health Sciences, Hyderabad, fulfilling the inclusion criteria and 50 attendants of the patients that were similar in demographic characteristics, i.e. age, gender, height, weight, BMI and socioeconomic status, were selected.

Each patient's blood sample (after 8 hours of fasting) was collected and sent to the LUMHS diagnostic and research laboratory for lipid profile (elevated total cholesterol higher than 200mg/dL and elevated LDL-C higher than 130mg/dL in LP patients). Where a consultant pathologist prepared each report (at least three years of post-fellowship experience), and the presence or absence of dyslipidemia was noted. All of these data have been recorded on a specially designed pro forma.

Statistical analysis was carried out using version 22.0 of SPSS. Results for quantitative variables, i.e. age, period of disease and index of body mass (BMI), were reported as mean and standard deviation. For qualitative variables such as gender, diabetes, hypertension, obesity and dyslipidemia (Present/ Absent), frequency and percentage were measured.

Effect modifiers such as age, disease duration, gender, diabetes mellitus (Yes/No), hypertension (Yes/No), and obesity (Yes/No) have been controlled by stratification and post-stratification. Chi-square was applied to determine their effect on outcome, and P-value less than or equal 0.05 was considered significant. The adjusted odds ratio was also calculated.

RESULTS

The age range in this study was 31.23±7.27 years, from 20-50 years of age. The mean age of A-group patients was 30.76±6.87 years, and 31.72±7.69 years in B-group. Subjects aged between 20 and 50 years.

Of 100 patients, 51(51.0%) were males and 49 (49.0%) were females (**Table I**). The mean disease period was 4.33 ± 2.08 months. The mean BMI was 29.54 ± 4.41 kg/m^2.

Dyslipidemia in A-group was seen in 35 (70.0%) patients 18 (36.0%) patients were seen in the B-group. Stratification of age-related dyslipidemia was shown in **Table II**. This result showed significant variations in dyslipidemia between the two groups of 20 and 35 years of age.

Dyslipidemia stratification concerning disease duration is shown in **Table III**. Dyslipidemia stratification for diabetes mellitus, obesity (BMI), and hypertension have been displayed in **Table IV**.

TABLE I: DISTRIBUTION OF PATIENTS ACCORDING TO DYSLIPIDEMIA IN BOTH GROUPS

		A-group (n=50)		B-group (n=50)	
		No. of Patients	%	No. of Patients	%
Dyslipidemia	Yes	35	70.0	18	36.0
	No	15	30.0	32	64.0
Obesity (BMI)	Yes	23	46.0	25	50.0
	No	27	54.0	25	50.0
HTN	Yes	20	40.0	18	36.0
	No	30	60.0	32	64.0

The P-value is statistically significant at 0.001.
The odds ratio is statistically significant at 4.148.

TABLE II: STRATIFICATION OF AGE-RELATED DYSLIPIDEMIA

Age of patients (years)	A-Group (n=50)		B-group (n=50)		P-value
	Dyslipidemia		Dyslipidemia		
	Yes	no	yes	no	
20-35	28 (80.0%)	07 (20.0%)	11 (34.38%)	21 (65.62%)	0.001
36-50	07 (46.67%)	08 (53.33%)	07 (38.89%)	11 (61.11%)	0.653
Gender					
Male	17 (73.91%)	06 (26.09%)	10 (35.71%)	18 (64.29%)	0.008
Female	18 (66.67%)	09 (33.33%)	08 (36.36%)	14 (63.64%)	0.037

TABLE III: DYSLIPIDEMIA STRATIFICATION CONCERNING THE DURATION OF THE DISEASE

Duration of disease (months)	A-Group (n=50)		B- group (n=50)		P-value
	Dyslipidemia		Dyslipidemia		
	yes	no	yes	no	
≤5 months	26 (76.47%)	08 (23.53%)	10 (30.30%)	23 (69.70%)	0.000
>5 months	09 (56.25%)	07 (43.75%)	08 (47.06%)	09 (52.94%)	0.527

TABLE IV: STRATIFICATION OF DYSLIPIDEMIA CONCERNING DIABETES MELLITUS

Diabetes mellitus	A-Group (n=50)		B- group (n=50)		P-value
	Dyslipidemia		Dyslipidemia		
	yes	no	yes	no	
Yes	16 (76.19%)	05 (23.81%)	11 (44.0%)	14 (56.0%)	0.031
No	19 (65.52%)	10 (34.48%)	07 (28.0%)	18 (72.0%)	0.007
Hypertension					
Yes	11 (61.11%)	07 (31.89%)	07 (35.0%)	13 (65.0%)	0.112
No	24 (75.0%)	08 (25.0%)	11 (36.67%)	19 (63.33%)	0.003
Obesity					
Yes	16 (69.57%)	07 (30.43%)	11 (44.0%)	14 (56.0%)	0.078
No	19 (70.37%)	08 (29.63%)	07 (28.0%)	18 (72.0%)	0.003

DISCUSSION

In some skin diseases, such as androgenetic alopecia[4,10] psoriasis, cardiovascular risk factors have been measured[11,12]. Although lipid abnormalities have been studied in LP, comparative cross-control studies on metabolic syndrome components in LP are limited. Some studies in cases of LP proved this association, as inflammation triggers lipid metabolism disorders such as increased serum triglycerides (TG) or lower lipoprotein cholesterol (HDL-C) levels. Such lipid disorders associated with chronic inflammation lead to an increase in the risk of cardiovascular dyslipidemia. Chronic inflammation may be associated with dyslipidemia in LP patients. Lipid level screening may be helpful for men or women with LP to detect people at risk and initiate preventive treatment against cardiovascular disease development[13]. Santiago SA et al.[11] reveal the higher Dyslipidemia prevalence in lichen planus patients compared to the B-group, i.e. 61.3% vs 32.5%.

Twenty-eight cases were males in another study[15], and 22 cases were females. Patient ages ranged between 19 years and 78 years. The mean age was 41.71 for LP males and 40.64 for lichen planus females. In patients with LP, the frequency of dyslipidemia was 38% in cases and 6% in controls[15]. Panchal F 2015[17] observed statistically significantly higher levels of TC, TG, and LDL-C and a decline in HDL-C levels in LP patients relative to their controls.

In a study, the prevalence of abnormally elevated total cholesterol (>200mgldl) was significantly elevated in LP patients vs healthy controls (53% of LP and 15% of control) ($x2=8.32$, $p<0.05$) and the prevalence of abnormally elevated LDL-C (>130mgldl) was highly significantly elevated in LP patients vs healthy controls (86.7% of LP and 10% of control) ($x2 = 42.92$, $p= <0.001$)[17].

A mean total cholesterol level of normal healthy control in Pakistan is reported as 190.06 mg/dL[20]. The total cholesterol level in Europe's whole population is 210.82 mg/dL[19]. Oral mucosal LP is more associated with dyslipidemia[20], and metabolic syndrome is mainly associated with the oral type of LP. At the same time, triglyceride is significantly associated with hypertrophic LP but also showed an increase in other lipid profile parameters but not significant[21].

Various pathways clarified the link between inflammation and dyslipidemia: Modulating lipoprotein lipase (LPL) enzymatic activity by anti-LPL antibodies and decreased LPL activity due to various pro-inflammatory cytokines such as tumor necrosis factor, interleukin-1, interleukin-6, and monocyte protein-1 and interferon chemo-attractant. In addition, atherogenic autoantibodies complexes to oxidize LDL and oxidized anti-cardiolipin are generated in response to inflammatory oxidation. It increases LDL deposition in the endothelial wall[22].

The clinical study of plasma lipids in patients with LP should be conducted not only for diagnosis and treatment but also for prevention, considering that atherosclerotic lesions begin to occur at an early age and intensify in the presence of other risk factors. To set priorities for intervention in dyslipidemia patients the risk of CV must be stratified. Dyslipidemia and

other risk factors such as kidney diseases, diabetes, smoking, and arterial hypertension are common and significantly enhance CV events. Initiatives to establish evidence to support the hypothesis of dyslipidemia in patients with LP could lead to the possibility of assessing CV risk[23].

CONCLUSION

This study concluded that the frequency of dyslipidemia is higher in lichen planus patients compared to the healthy group.

Ethical permission: College of Physicians & Surgeons Pakistan REU permission letter No. CPSP/ REU/DER-2015-164-562, dated 23-6-2018.

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AUTHOR CONTRIBUTIONS

Khan S: Concept and design
Pirzado MS: Data interpretation, drafting of the article
Kalhoro HBA: Intellectual content
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