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Original Research Article

A prospective case control study on metabolic syndrome in lichen planus in a tertiary care centre

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ABSTRACT

Background: Lichen planus is an autoimmune, inflammatory papulosquamous disease affecting skin and mucous membrane with a possible association with the parameters of metabolic syndrome.
Methods: We carried out a hospital based case control study among patients attending DVL OPD during a period of 1.5 years (January 2015 - May 2016). Study population included 40 cases of LP and 80 age and sex matched controls. Relevant history, clinical examination and blood investigations were done. Diagnosis of MS was made based on IDF criteria.
Results: There was no significant association between metabolic syndrome and lichen planus (p=0.292). Although there was higher prevalence of hypertension (47.5% vs. 27.5%, p=0.029), triglyceride level (25% vs. 10%, p=0.030) and low HDLC levels (65% vs. 45%, p=0.039). We could not establish significant association between FBS and waist circumference with LP.
Conclusions: Though metabolic syndrome was not significantly associated with LP, its components such as hypertension, triglycerides and low HDLC levels were significantly associated with LP as per the study. Therefore patients with LP need to be screened to rule out each of these parameters to avoid later complications.

Keywords: Lichen planus, Metabolic syndrome, Hypertension, Triglyceride

INTRODUCTION

Lichen planus, a papulosquamous disease has derived its nomenclature from the greek word "Leichen" as it resembled lichens growing on the rock and planus that stands for flat.[1] It was first described by Dr. Wilson in 1869. He explained it to be an inflammatory disorder involving stratified squamous epithelium of unknown etiology.[2] Initially the condintion was named "lichen ruberplanus" and "lichen psoriasis". In 1895, Weyl demonstrated Wickham Striae (reticulate white lines) on the surface of lichen planus lesions.[3]

Lichen planus is described as a subacute, chronic dermatosis which is characterized by shiny, flat topped, small, polygonal violaceous papules that may coalesce into plaques.[4] It is an idiopathic inflammatory disease which affects the skin and the mucous membranes. Several triggers like drugs, contact allergen and viruses have been identified.[5,6]

It is often believed to be a T-cell-mediated inflammatory disorder. Inflammation produces alteration of lipid metabolism such as increase in serum triglycerides or decrease in high-density lipoprotein cholesterol.[7] It has been proposed that immunological defect in endocrine dysfunction causing diabetes mellitus may also contribute to development of lichen planus. In 1963, Grinspan found an association between oral lichen planus, diabetes mellitus and hypertension and named it as Grinspan syndrome.[8]

Metabolic syndrome is a group of risk factors which comprises dyslipidemia, elevated blood pressure, impaired glucose tolerance and increased abdominal obesity. Metabolic syndrome is found to be associated with Lichen planus and other dermatological conditions such as psoriasis, skin tags, androgenetic alopecia, acanthosisnigricans, systemic lupus erythematosus.[9] The International Diabetes Federation criteria to define metabolic syndrome has been used in this study.

Padhi et al has mentioned that chronic inflammation along with elevated levels of proinflammatory cytokines is the hallmark of MS Adipocytokines (such as Leptin, adiponectin, tumor necrosis factor-α (TNF), interleukin 6 (IL-6), monocyte chemotactic protein-1(MCP-1)) which play a major role in the pathogenesis of insulin resistance and metabolic complications such as dyslipidemia, hypertension, and premature heart disease. The levels of these adipocytokines have been shown to be elevated in many dermatological diseases.[10]

Shi-Sheng Zhou has illustrated about another factor namely Oxidative stress is a condition of oxidant/antioxidant imbalance in which the net amount of reactive oxygen species (ROS) exceeds the antioxidant capacity of the body. Xenobiotics is one of the major sources of ROS. It includes chemicals cosmetics environmental pollutants, drugs and even components of food. Skin is involved in the metabolism and elimination of xenobiotics, endogenous bioactive substances, lipids, and cholesterol from the body. It has been proposed that any derangement in the elimination of ROS through sebum will increase levels of circulating lipids and cholesterol, thus increasing the risk of dyslipidemia and Metabolic syndrome.[9,11] The proposed immunological defect in endocrine dysfunction causing diabetes mellitus may also contribute to development of lichen planus.

METHODS

This case control study was conducted in Mahatma Gandhi Medical College and Research Institute, Pondicherry among patients attending DVL OPD during a period of 1.5 yrs (January 2015 - May 2016). Study was initiated following the Institutional Ethics committee clearance. Patients aged more than 18 yrs and diagnosed clinically of lichen planus along with age and sex matched individuals without any dermatological ailments were enrolled into the study. Pregnant women, lactating women and patients receiving treatment for lichen planus such as systemic corticosteroids, immuno-suppressants were excluded from the study. 120 patients were included in the study of which 40 were LP patients and 80 were controls.

Demographic data and history of all individuals included in the study were collected. Later the parameters of metabolic syndrome were measured in each patient of both groups. This included the measurement of waist circumference, systolic and diastolic blood pressure. Waist circumference was measured at the mid-point between the lower margin of the last palpable rib and the iliac crest.[12] Blood investigations such as Triglyceride level, HDL-C level, fasting glucose level (12-hour fasting period) were also done for each individual of both groups. Photographs of the lesions were taken. Informed consent was taken from the patients in their language prior to their inclusion in the study.

All data were entered into a data collection proforma sheet and entered into Excel (MS Excel). Statistical analysis was carried out using SPSS version 20 (IBM SPSS, US) software. Pearson's chi square test was the statistical method which was used in the study to find the prevalence of metabolic syndrome among patients with lichen planus and matched controls.

RESULTS

The maximum number of LP patients belonged to third and sixth decade (Figure 1). Out of the 40 cases of LP, 10 (25%) were males and 30 (75%) were females (1: 3 male: female ratio) as given in Figure 2 with mean age of the study population being 41.53±13.54 yrs.

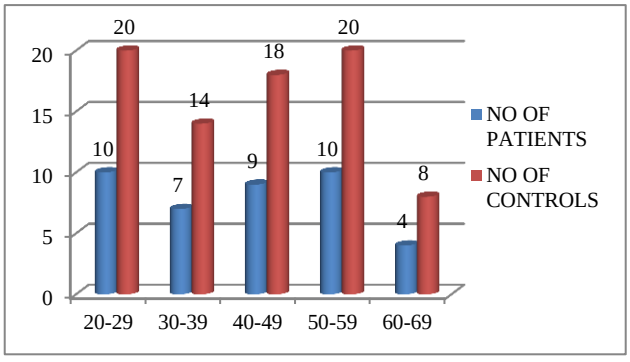

Figure 1: Age distribution among patients with and without LP.

Clinical patterns of lichen planus in the study

Among the 40 patients with LP, 2 (5%) patients had oral lesions alone, 2 (5%) patients had scalp lesions alone (lichen planopilaris) while remaining 36 (90%) patients had skin lesions. Among the 36 patients, 31 (86.1%) had skin lesions alone. Three (8.3%) patients had nail

involvement along with skin lesions and 2 (5.5%) patients had oral lesions along with skin lesions.

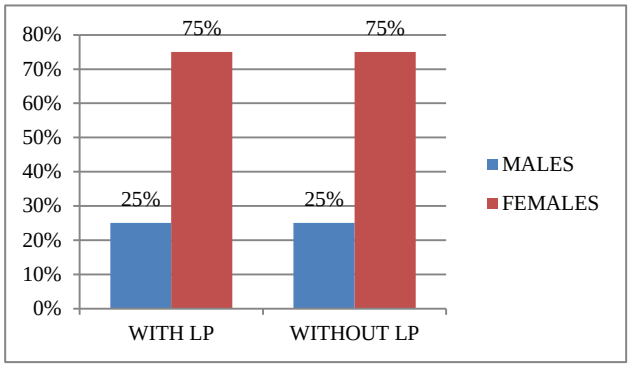

Figure 2: Gender distribution among patients with and without LP.

Among 40 patients with LP, 18 (45%) patients had metabolic syndrome when compared to 32(40%) individuals without LP (p=0.292). Among patients with metabolic syndrome, majority of those with LP belonged to the age group between 50-59 years (38.88%) while those in control group belonged to 40-49 years and 50-59 years (28.12% each). Of the patients with LP, metabolic syndrome was found in 14 females (77.8%) and 4 males (22.2%) (p=0.714). In the control group, metabolic syndrome was present in 6 (19%) males and 26 (81%) females.

Table 1: Lichen planus and its associations.

S. no	Parameter	Lichen planus		P value
		Present	Absent	
1	Increased waist circumference	25	15	0.599
2	Hypertension	19	21	0.029
3	Raised FBS	19	21	0.359
4	Low HDLC level	26	14	0.039
5	Hypertriglyceridemia	10	30	0.03

Hypertension was present among 19 (47%) patients in LP group (p=0.029) and 22 (27.5%) patients among the control group. Of the 19 patients with hypertension in the LP group, 17 (89.5%) were females and 2 (10.5%) were males. Raised fasting blood sugar (FBS) values in patients with and without LP was found in 19 (47.5%) and 31 (38.75%) respectively (p=0.359). Triglyceride levels were found to be high in 10 (25%) patients with LP when compared to those without LP which was only 8 (10%) (p= 0.030). Among 40 patients with LP, 26 (65%) had low HDL levels when compared to 36(45%) individuals among the controls (p=0.039**)**. Of the LP patients with low HDLC levels, 21 (80.8%) were females and 5 (19.2%) were males. Waist circumference was found to be higher in 25 (63%) and 46 (58%) individuals with and without lichen planus respectively (p=0.599) (Table 1).

Hence hypertension, hypertriglyceridemia and low HDLC levels were found to have statistically significant association with lichen planus with p values of 0.029, 0.03 and 0.039 respectively**.**

DISCUSSION

Lichen planus is an inflammatory, papulosquamous disorder which involves the skin and mucous membrane. Metabolic syndrome is a group of risk factors which includes elevated blood pressure, hypertriglyceridemia and low concentration of high density lipoprotein (HDL) cholesterol (dyslipidemia), central obesity and impaired glucose tolerance. Few studies have shown association lichen planus with Hep C infection while few have disproved it.[13-15] One study has also showed an association between hashimotos thyroiditis and lichen planus.[16]

The association between metabolic syndrome and lichen planus is not well established though a few studies have shown higher rate of metabolic syndrome in patients with lichen planus.[17] In addition to metabolic syndrome as a whole, there are studies describing higher incidence of individual components like raised waist circumference, hypertension, low HDLC, raised triglycerides and raised fasting blood glucose in LP patients.[7]

In our study we have tried to find out the presence of any association between lichen planus and metabolic syndrome.

Demographic details

Age

In our study, among the 40 patients with LP, maximum number of patients belonged to third and sixth decade which was 10 (25%) in each group. The mean age of patients with LP was 41.53±13.54 yrs (median= 41 and range=45). The control group consisted of age and gender matched controls with a mean age of 41.43±13.45 yrs (median= 41.50 and range=45). This was found to be similar to the study done by Omal et al among south Indian population was found to be similar to the present study.[18] Similarly by Mehdipour in their study reported increased prevalence of LP among patients of age group 40 to 60 yrs.[19]

Among the patients with metabolic syndrome, maximum number of LP patients belonged to the sixth decade which was 7 (38.88%) of the 18 patients. While among the control group, maximum individuals with metabolic syndrome belonged to fifth and sixth decade which was 9 (28.12%) each in both decades. While in a study done by Prasad et al, the prevalence of metabolic syndrome was highest in the seventh decade (65%).[20]

Gender

Among the study group, 30 (75%) were females and 10 (25%) were males. Though there was a female predominance (3:1), this was not statistically significant. Parihar et al in his study found out that there was a female predominance (1:0.8) among lichen planus patients.[21] 80% (40) of patients were females when compared to 20% (10) of males with metabolic syndrome. Balasubramaniam et al in their study found that 60% of females enrolled into the study among Indian population, were found to have metabolic syndrome.[22] It is in accordance with this study.

Metabolic syndrome

Among the patients with LP; 18 (45%) had metabolic syndrome, (14 (77.8%) females and 4 (22.2%) males) while in those without LP, 32 individuals (26 (81.25%) females and 6 (18.75%) males) had metabolic syndrome. There was no significant association between LP and metabolic syndrome (p=0.292).

Similar findings were noted by Arias et al in their study with a larger study group (100). In their study according to ATP III criteria for MS, only 27% of patients with lichen planus had MS while that in the control group was 20%.This was insignificant with a p value of 0.310.[7]

In a study done by Baykal et al, out of the 79 patients with LP, 26% had metabolic syndrome when compared to 12% of the control group. They also concluded that presence of mucosal LP has an even higher risk of developing metabolic syndrome.[17] However in a study done by Krishnamoorthy et al, only 27% of the patients with mucosal LP had metabolic syndrome which was not significant.

Blood pressure

In our study, 19 (47.5%) patients among the study group had hypertension while this was only 22 (27.5%) of 80 patients within the control group who had hypertension. This was found to be statistically significant with p value of 0.029. Among the patients LP patients with hypertension, 17 (89.5%) were females and 2 (10.5%) were males. The mean systolic BP among the cases and controls were 125.7±12.9 mmHg and 117.58±15.3 mmHg respectively while the mean diastolic BP was 83.2±5.84 mmHg within the cases and 75.2±8.37 mmHg among the control group.

Similar results were observed by Baykel et al in their study with 26 (32.9%) of 70 LP patients suffering from hypertension with a p value of 0.027.[17]

However this was not in accordance with the study done by Salvador Arias-Santiago et al were they could not prove any association between LP and hypertension.[7]

Fasting blood sugar

In this study, we made the observation that fasting blood sugar was high in 19 (47.5%) patients with LP and 31 (38.75%) patients without LP. But this was statistically insignificant with a p value of 0.359.Ths mean FBS among the LP patients was 103.03±29.25 mg/dl and the same among the control group was found to be 97.15±28.25 mg/dl.

In a study done by Atefi et al, they have reported higher prevalence of DM among patients with LP.[23] Out of the 80 patients with LP, 16 were found to be diabetic and 14 were found to have impaired fasting glucose levels which were found to be statistically significant with a p value of 0.039. Similar findings of impaired fasting glucose levels were recorded by Baykel et al in a case control study among LP patients, with a P value of 0.012.[17] Among 23 patients with oral erosive LP, Grinspan found higher prevalence of diabetes mellitus and hypertension (1963) and later was named as Grinspan syndrome.[24]

Serum lipids

Triglyceride levels were found to be high in patients with LP in this study. It was significantly high when compared to the control group. The observations included high triglyceride levels in 10 (25%) patient with LP when compared to 8 (10%) in control group. Among the 10 LP patients with hypertriglyceridemia, 7 (70%) were females and 3 (30%) were males. The mean values of triglyceride levels were 131.33±37.1 mg/dl and 116.71±37.7 mg/dl among cases and controls in this study.

High density lipoproteins were also found to be significantly low in the study group. It was low in 26 (65%) of the 40 patients with LP while it was low in 36 (45%) of the 80 individuals without LP. The p value of the same was found to be 0.039and hence significant. 21 (80.8%) were females and 5 (19.2%) were males among the LP patients with low HDLC levels. The mean HDLC levels were 44.6±7.34 mg/dl and 46.76±6.26 mg/dl among the cases and controls respectively.

Mehdipour et al in their study done among 88 patients were divided into 3 groups with 22 patients in each group. Group 1 consisted of patients with erosive oral LP, group 2 consisted of non-erosive oral LP patients and 3rd group consisted of healthy individuals. When compared to the control group they found a significant relation between oral LP with triglycerides levels and low HDLC levels (p value of 0.00 and 0.02 respectively).[19]

Study done by Sarkar et al could also demonstrate similar results in a case control study done among 25 LP patients and age and gender matched controls. Along with altered HDLC and triglyceride levels, they found that the levels of LDL was also high among LP patients.[25]

While in a study done by Beykal et al among LP patients, they found there was no significant derangement in triglyceride levels and HDLC levels with p values for the same being 0.182 and 0.142 respectively.[17]

Waist circumference

25 (62.5%) patients with LP had a higher waist circumference than that specific for the ethnic group. Though there were a higher percentage of LP patients with increased waist circumference when compared to the controls (57.5%), the p value was 0.599 thus making it insignificant. The mean waist circumferences of the patients with and without LP were found to be 86.63±12.07 cm and 86.86±9.03cm respectively.

Baykal et al made similar observation in their study. The p value was found to be 0.822 with a mean waist circumference of 93.62±12.25 cm among LP patients.[17] Arias-Santiago et al observed that the waist circumference distribution among case and control group was similar with no higher prevalence among LP patients.[7]

CONCLUSION

Based on the methodology and statistical analysis, we have made the following observations. 45% of patients with LP had MS which was not statistically significant. Metabolic syndrome was diagnosed in 41.6% of individuals who participated in the study. 40% of the patients among the control group were found to have metabolic syndrome. Hypertension was statistically significant among the patients with LP than the control group. Also there was increased prevalence of low HDLC and high triglyceride levels in LP patients. Hence screening patients with LP for these associations may lead to easy diagnosis of these comorbidities and prompt treatment of the same.

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