



Original Research Article

Prevalence of metabolic syndrome among psoriasis and lichen planus patients attending tertiary care hospital in Bundelkhand region: A prospective study

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ABSTRACT

Background: Metabolic syndrome is constellation of many different disorders. The common conditions associated with metabolic syndrome are obesity, hypertension, dyslipidemia and insulin resistance. These conditions do play some role in developing cardiovascular disease beyond traditional risk. Metabolic syndrome have been commonly seen in patients of many skin diseases including psoriasis, lichen planus, acne inversa and even in skin malignancies. In chronic skin disorder and even in metabolic syndrome chronic inflammation has been shown to play some role in the pathogenesis of disease. The present study is designed with a view to know any association between skin diseases especially psoriasis and metabolic syndrome, as well as expression of C-reactive protein in psoriasis and other skin diseases in this region.

Materials and Methods: Present study was conducted on 76 histopathologically confirmed cases of Psoriasis & Lichen Planus and 70 age and sex matched controls with skin lesions other than psoriasis and lichen planus. For metabolic syndrome criteria proposed by National cholesterol education programme (NCEP) ATP III was used. Triglycerides, HDL cholesterol, Blood sugar and CRP level was quantitatively determined on serum/plasma of patients. Chi square test and SPSS 19.0 software was used for statistical analysis.

Results: Among psoriasis patients 18/52 had metabolic syndrome while this figure was low in lichen planus patients 7/24. The incidence of metabolic syndrome with skin disease was high as compared to control population and it was also statistically significant. Cases (psoriasis and lichen planus) with metabolic syndrome had high CRP value 61.1% (11/18) and 57.1% (04/07) respectively as compared to control 12.8% (09/71) and also displayed significant association.

Conclusion: It was concluded from this study that metabolic syndrome is an important co-morbidity with psoriasis and lichen planus which requires screening to avoid complications in later life.

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1. Introduction

Metabolic syndrome is constellation of many different disorders. This syndrome increases the risks of many diseases including mainly diabetes and heart disease. The common conditions associated with metabolic syndrome are obesity, hypertension, dyslipidemia and insulin resistance.¹ These conditions do play some role in developing cardiovascular disease beyond traditional risk.² In one Indian study conducted in year 2006, the incidence of

metabolic syndrome was 18.3%.³

Psoriasis is a chronic inflammatory skin disorder and even in metabolic syndrome chronic inflammation has been shown to play some role. Though the pathogenesis of both the conditions are not fully ascertained yet in different components of metabolic syndrome like atherosclerosis, obesity and in psoriasis, oxidative stress, mediators of inflammation like TNF- α , ICAMs, Interferon-gamma, has been found to be involved in their pathogenesis.^{4,5} Lichen planus is an autoimmune disease where the basal layer of epidermis gets damaged altering the surface antigen expression and in patients of lichen planus, significant

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association with dyslipidemia and carbohydrate intolerance has been seen.^{6,7} High ESR and increased levels of fibrinogen and CRP in patients of lichen planus have been commonly found and thought to be a bridging link with dyslipidemia. Metabolic syndrome have been commonly seen in patients of many skin diseases including psoriasis, lichen planus, SLE, acanthosis nigricans, acne inversa and even in skin malignancies.⁸

In many studies it was found that CRP levels were higher in many chronic skin diseases like psoriasis and CRP levels have also been shown to be associated with different components of metabolic syndrome. So it was thought that C-reactive protein (CRP) could be a good tool in the management as well as in the monitoring of disease.

The present study is designed with a view to know any association between skin diseases especially psoriasis and metabolic syndrome, as well as expression of C-reactive protein in psoriasis and other skin diseases in this region.

2. Materials and Methods

The present study was conducted in Department of Pathology and Dermatology, MLB Medical College, Jhansi situated in Bundelkhand region of UP. A total of 76 patients of Psoriasis & Lichen Planus were taken for the study only after getting the consent of participants and ethical approval. 70 age and sex matched controls with skin disorder other than psoriasis and lichen planus like fungal infections, drug reaction, scabies and urticaria, were selected. The blood sample and tissue material was collected for serology and histopathology to confirm the diagnosis only after examining the patients and diagnosing clinically. Skin biopsies were taken after informed consent of the patients. Biopsies were processed routinely and 3-5 micron thick sections were prepared. Sections were stained with haematoxylin & eosin and then studied for histological changes.

Triglycerides, HDL cholesterol and Blood sugar was quantitatively determined on serum/plasma of patient by fully automatic biochemistry analyser (Selectra). CRP was evaluated in serum of patient using RHELAX CRP Reagent.

To define a case of metabolic syndrome, National cholesterol education programme (NCEP) ATP III criteria were applied. According to that out of following five parameters at least three are mandatory to define a case of metabolic syndrome. (1) Abdominal obesity: diagnosed by waist circumference: ≥ 102 cm in men or ≥ 88 cm in women at the level of the umbilicus. (2) Elevated triglycerides: defined by ≥ 150 mg/dl. (3) Reduced high-density lipoprotein (HDL) cholesterol when HDL level is <40 mg/dl for men and <50 mg/dl for women (4). Elevated blood pressure when systolic is ≥ 130 mmHg or diastolic ≥ 85 mm Hg. (5) Elevated fasting blood glucose: defined by blood sugar level ≥ 110 mg/dl.

The main factor for categorizing the severity of the disease in patients was proportion of the body surface area involved. In Mild - $<3\%$ BSA, Moderate- 3-10% BSA Severe - $>10\%$ BSA is involved. Data was analyzed using SPSS 19.0 and chi-square test is applied.

3. Results

In this study 76 cases of skin diseases and 70 controls were enrolled and analyzed. Following observations were made. After histopathological examination 52 cases of Psoriasis (68.4%) and 24 cases of Lichen Planus (31.6%) were diagnosed. The male to female ratio was 1.4:1 in patients while in control group this ratio was 1.6:1. Majority of the cases were from rural areas (65.7%).

Age group of the patients in both psoriasis and lichen planus was not a significant factor in our study. Majority of the patients belonged to 3rd-5th decade. In both psoriasis (36.5%) and lichen planus (37.5%) majority of the cases had shorter duration of the diseases (<6 months) as well as they also had milder nature of disease i.e. $<3\%$ BSA was involved (Table 1).

Among cases of skin disease (psoriasis & Lichen planus), 32.89% (25/76) patients had metabolic syndrome while this figure was almost half 17.14% (12/70) in control population.

Out of 52 cases of psoriasis 18 patients (34.6%) fulfilled the criteria of metabolic syndrome while this number was 7 among 24 patients of lichen planus. In psoriasis the most patients suffering from metabolic syndrome belonged to 4th & 5th decade (14/18). Similar picture was seen in case of lichen planus (70.1% i.e. 05/07).

The association between the cases of skin diseases including both psoriasis and lichen planus and metabolic syndrome was significant (P value <0.005) (Table 1) however when the association was studied separately for psoriasis and lichen planus, no significant association was found with metabolic syndrome (P value >0.005) (Table 2).

In both psoriasis and lichen planus, the number of patients with high level (>6 mg/L) of C-reactive protein was 40.3% and 33.3% respectively. Only few (9/70) from control population had high level of CRP (12.8%). In both psoriasis (70%) and lichen planus (80%) patients with severe form of disease had high levels of CRP (>6 mg/L) (Tables 3 and 4).

In both psoriasis and lichen planus CRP value was higher in most of the patients with metabolic syndrome values being 61.1% (11/18) and 57.1% (04/07) respectively as compared to control population where only few 12.8% (09/71) had high CRP value (Table 4).

Table 1: 1: Association of cases (Psoriasis and Lichen planus) with metabolic syndrome

Metabolic Syndrome	Cases (Psoriasis & LP)	Control	Total
Present	25 (32.89%)	12 (17.14%)	37(25.34%)
Absent	51 (67.11%)	58 (82.86%)	109(74.66%)
Total	76 (100%)	70 (100%)	146(100%)

Chi-square value=4.778, p value=0.036

Table 2: Association of Psoriasis and Lichen planus with metabolic syndrome

Metabolic syndrome prevalence	Psoriasis	Lichen planus	Total
Present	18 (34.6%)	7 (29.1%)	25(32.89%)
Absent	34 (65.4%)	17 (70.9%)	51(67.10%)
Total	52 (100%)	24 (100%)	76(100%)

Chi-square value = 0.221, p value = 0.6383

Table 3: Association of CRP level with severity of Psoriasis and Lichen planus

CRP Level	Severity of Disease					
	Psoriasis			Lichen planus		
	Mild	Moderate and Severe	Total	Mild	Moderate and Severe	Total
CRP Positive (>6mg/ L)	3 (13.6%)	18 (60%)	21(40.4%)	2 (16.6%)	6(50%)	8(33.34%)
CRP Negative (<6mg/ L)	19 (86.4%)	12(40%)	31(59.6%)	10 (83.4%)	6(50%)	16(66.66%)
Total	22(100%)	30(100%)	52(100%)	12(100%)	12(100%)	24(100%)
Chi-square value		11.33			3	
P value		0.0007			0.08	

Table 4: Association of CRP level with metabolic syndrome in control, psoriasis and lichen planus

CRP Level	Metabolic Syndrome					
	Control (n = 70)		Psoriasis (n = 52)		Lichen planus (n = 24)	
	Present	Absent	Present	Absent	Present	Absent
CRP Positive (>6mg/ L)	7(58.3%)	2 (3.4%)	11(61.1%)	10 (16.6%)	4 (57.1%)	4 (23.6%)
CRP Negative (<6mg/ L)	5 (41.7%)	56(96.6%)	7 (38.9%)	24 (83.4%)	3 (42.9%)	13 (76.5%)
Total	12(100%)	58(100%)	18(100%)	34(100%)	7(100%)	17(100%)
Chi-square value		26.73		4.912		1.235
P value		0.0001		0.02667		0.26643

4. Discussion

Several studies have shown association of metabolic syndrome with psoriasis, the present study was designed with a view to strengthen the same findings in a population with low socioeconomic strata. In this study the prevalence of metabolic syndrome in patients of psoriasis was found to be 34.6% whereas in patients of lichen planus it was 29.1%.

The study revealed that there is significant association of skin diseases (psoriasis and lichen planus) with metabolic syndrome as compared to other skin disorders. (P value =0.036 which is <0.05). The same did not hold true when the cases of psoriasis and lichen planus were analyzed separately (P value = 0.638 which is >0.05) which could be because of small sample size.

There are high chances of developing metabolic syndrome in patients of some skin diseases particularly Psoriasis. Pathogenesis involved in the association of metabolic syndrome with skin disorders like psoriasis is yet to be ascertained. However some cell mediators of inflammation have been found to play some role in it like, TNF and IL-6. But these inflammatory mediators have not been found to be associated with metabolic syndrome as a whole but with different individual components of metabolic syndrome i.e. hypertension and lipid abnormality. After that many studies have been conducted, few in India also. Among many studies conducted here to know the association of psoriasis and metabolic syndrome, one has shown the prevalence of metabolic syndrome 18.3%.³

The chances of development of metabolic syndrome in patients of psoriasis is higher ~2-3 times (36.6%-54.9%) than the control population without any skin disease which is similar to our findings.⁹ Gisondi et al¹⁰ also conducted a study in psoriasis patients with plaque like skin lesion and used the same NCEP ATP III criteria. In their study the prevalence of metabolic syndrome was greater than the control population and was also significant statistically. Zindancı et al¹¹ after doing similar study on similar type of cases found a high prevalence (~53%) of metabolic syndrome. While Nisa and Qazi¹² found somewhat lower prevalence (~28%) in their study. Our findings were similar to those in the above studies though slightly lower.

In the present study, prevalence of metabolic syndrome was found to be slightly lower as compared to other studies. In Bundelkhand which is an underdeveloped region, majority of population belong to low socioeconomic strata. Since this study was conducted in Bundelkhand region, so most of the cases were of low socioeconomic strata and their poor status could have been a cause for low prevalence of metabolic syndrome in our study as it is known fact and have been found in many studies that components of metabolic syndrome are more common in people of high and middle socioeconomic strata.¹³

In many studies (Gisondi et al, & Zindacı et al) association of age with the prevalence of metabolic syndrome has been seen and metabolic syndrome was found to occur in older age group after fourth decade.^{10,11} In some other studies it was found that the prevalence is more after 5th decade and numbers are high in older adults than young ones.^{9,14} In our study maximum numbers of patients (38.8%) fall between 40-60 years age groups.

Gisondi et al, Nisa and Qazi and Kim et al^{10,12,14} also tried to find out any association between gender and occurrence of metabolic syndrome in psoriatics however no such association was noticed in their studies. But in the present study prevalence was more in male patients.

Duration of the disease does play some role in development of metabolic syndrome in patients of psoriasis. Gisondi et al¹⁰ had shown that with longer duration of disease chances of developing metabolic syndrome is more. Similar result was found in the present study with most of the metabolic syndrome case were chronic psoriatics i.e. more than one year.

In present study the findings were similar to other studies (Gisondi et al and Nisa and Qazi) where the severity of the disease had no association with the prevalence of metabolic syndrome. Zindancı et al¹¹ and Mebazaa et al¹⁵ also found the same result. However Langan et al¹⁶ have shown the opposite with findings that severity does increase the chances of metabolic syndrome in patients of psoriasis.

In this study, CRP level was positive (>6 mg/L) in 40.3% of psoriasis patients with 33.3% (7/21) of them having severe form of disease. Among CRP positive

patients, 52.3% (11/21) patients have metabolic syndrome. The role of CRP in psoriasis has been studied by many. Vanizor et al¹⁷ and Malbris et al¹⁸ have found higher CRP levels in psoriatic patients. Kimbell et al¹⁹ have also found similar results in their study and have also shown a positive association with severity of disease. In present study significant association of CRP level positivity with psoriasis was found especially in cases with moderate and severe disease.

Lichen Planus is another skin disease which mainly involves skin and mucous membranes. Pathogenesis of lichen planus also involves inflammatory mediators as seen in Psoriasis. Dyslipidaemia has been found to be significantly associated with Lichen Planus in some studies.²⁰ Though in present study no significant association between the two was observed but the prevalence of metabolic syndrome was much higher (29.16%) as compared to control population.

The reasons behind high prevalence of metabolic syndrome in old psoriasis patients also hold true for patients of lichen planus as in our study majority of the patients of lichen planus who had metabolic syndrome were of fourth to sixth decade.

In contrast to psoriasis the numbers of females patients of lichen planus with metabolic syndrome were higher in comparison to male. Zindancı et al,¹¹ also found positive association with gender attributing it to their high BMI however Gisondi et al., Nisa and Qazi and Kim et al^{10,12,14} did not find any such association in their study. No association between severity of disease (Lichen Planus and metabolic syndrome) was seen in the present study.

In present study, CRP level was positive (>6 mg/L) in 33.3% of lichen planus patients with almost half of them 50% (4/8) having severe form of disease.

5. Conclusion

This study found that the skin diseases (Psoriasis & Lichen planus) have an association with metabolic syndrome and a positive correlation of metabolic syndrome was seen with Psoriasis & Lichen Planus. This correlation was found to be statistically significant. However in our study both psoriasis and lichen planus did not show any significant association with metabolic syndrome individually. This could be because of small sample size. The chronicity of the disease does play some role in the development of metabolic syndrome as majority of the patient had skin disease for more than a year in our study Severity of skin disease did not show any such association but CRP levels were found to be raised in patients with severe disease. It can be concluded from this study that metabolic syndrome is important co morbidity with skin disease especially psoriasis and it requires screening of patients with Psoriasis especially those with longer duration of disease for metabolic syndrome. Hence psoriasis patients should be evaluated for metabolic

syndrome to assess the risk of cardiovascular diseases so that the preventive steps could be taken. Larger study with bigger sample size is required to further strengthen our findings.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

- Eckel RH, Grundy SM, Zimmet PZ. The metabolic syndrome. *Lancet*. 2005;365(9468):1415–28.
- Mente A, Yusuf S, Islam S, McQueen MJ, Tanomsup S, Onen CL, et al. Anand SS Metabolic syndrome and risk of acute myocardial infarction: a case-control study of 26,903 subjects from 52 countries. *J Am Coll Cardiol*. 2010;55(21):2390–8.
- Deepa M, Farooq S, Datta M, Deepa R, Mohan V. Prevalence of metabolic syndrome using WHO, ATP III and IDF definitions in Asian Indians: the Chennai Urban Rural Epidemiology Study (CURES-34). *Diabetes Metab Res Rev*. 2007;23(2):127–34.
- and TPG. Metabolic syndrome and skin: Psoriasis and beyond. *Indian J Dermatol*. 2013;58(4):299–305.
- Salihbegovic E, Hadzigraphic N, Cickusic A. Psoriasis and Metabolic Syndrome. *Med Arch*. 2015;69(2):85–7.
- Dreiherr J, Shapiro J, Cohen AD. Lichen planus and dyslipidaemia: a case-control study. *Br J Dermatol*. 2009;161(3):626–9.
- Gorouhi F, Davari P, Fazel N. Cutaneous and Mucosal Lichen Planus: A Comprehensive Review of Clinical Subtypes, Risk Factors, Diagnosis, and Prognosis. *Sci World J*. 2014;2014:1–22.
- Su LH, Chen THH. Association of androgenetic alopecia with metabolic syndrome in men: a community-based survey. *Br J Dermatol*. 2010;163(2):371–7.
- McDonald CJ, Calabresi P. Psoriasis and occlusive vascular disease. *Br J Dermatol*. 1978;99(5):469–75.
- Sommer DM, Jenisch S, Suchan M, Christophers E, Weichenthal M. Increased prevalence of the metabolic syndrome in patients with moderate to severe psoriasis. *Arch Dermatol Res*. 2006;298(7):321–8.
- Gisondi P, Tessari G, Conti A, Piaserico S, Schianchi S, Peserico A, et al. Prevalence of metabolic syndrome in patients with psoriasis: a hospital-based case-control study. *Br J Dermatol*. 2007;157(1):68–73.
- Zindanci I, Albayrak O, Kavala M, Kocaturk E, Can B, Sudogan S, et al. Prevalence of Metabolic Syndrome in Patients with Psoriasis. *Sci World J*. 2012;2012:1–5. doi:10.1100/2012/312463.
- Nisa N, Qazi M. Prevalence of metabolic syndrome in patients with psoriasis. *Indian J Dermatol Venereol Leprol*. 2010;76(6):662–5.
- Gupta R, Deedwania PC, Gupta A, Rastogi S, Panwar RB, Kothari K. Prevalence of metabolic syndrome in an Indian urban population. *Int J Cardiol*. 2004;97(2):257–61.
- Kim GW, Park HJ, Kim HS, Kim SH, Ko HC, Kim BS. Analysis of cardiovascular risk factors and metabolic syndrome in Korean patients with psoriasis. *Ann*. 2012;24:11–15.
- Mebazaa A, Asmi ME, Zidi W, Zayani Y, Rouhou RC, Ounifi SE, et al. Metabolic syndrome in Tunisian psoriatic patients: prevalence and determinants. *J Eur Acad Dermatol Venereol*. 2011;25(6):705–9.
- Langan SM, Seminara NM, Shin DB, Troxel AB, Kimmel SE, Mehta NN, et al. Prevalence of Metabolic Syndrome in Patients with Psoriasis: A Population-Based Study in the United Kingdom. *J Invest Dermatol*. 2012;132:556–62.
- Kural BV, Orem A, Cimşit G, Yandi YE. Calapoglu M Evaluation of the atherogenic tendency of lipids and lipoprotein content and their relationships with oxidant-antioxidant system in patients with psoriasis. *Clin Chim Acta*. 2003;328(1-2):71–82.
- Mallbris L, Ritchlin CT, Ståhle M Metabolic disorders in patients with psoriasis and psoriatic arthritis. *Curr Rheumatol Rep*. 2006;8(5):355–63.
- Kimball AB, Gladman D, Gelfand JM, Gordon K, Horn EJ, Korman NJ, et al. National Psoriasis Foundation clinical consensus on psoriasis comorbidities and recommendations for screening. *J Am Acad Dermatol*. 2008;58(6):1031–42.

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