Original Research Article

Metabolic syndrome in patients with chronic plaque psoriatic disease: a case-control study from western Uttar Pradesh, India

Shailendra Kumar Jain[1], Preeti Jain[2]*, Abhishek Singh[3], Shewtank Goel[4]

[1]Department of Skin and VD, [2]Department of Pathology, FH Medical College, NH-2, Tundla, Uttar Pradesh, India
[3]Department of Community Medicine, SHKM Government Medical College, Mewat, Haryana, India
[4]Department of Microbiology, Teerthanker Mahaveer Medical College, Moradabad, Uttar Pradesh, India

*Correspondence:
Dr. Preeti Jain,
E-mail: drpreetijain28@gmail.com

ABSTRACT

Background: Various studies on psoriasis and metabolic syndrome have shown a large variation in their results. An increasing frequency is imposing a substantial burden on the overall health of psoriasis patients that needs to be appropriately foreseen and addressed. Aim of this study was to study various aspects of metabolic syndrome in patients with chronic plaque psoriatic disease in northern Indian region.
Methods: A cohort of patients registering for treatment of chronic plaque psoriasis at Dermatology outpatients' department formed the study population. Detailed history was captured. General physical examination was carried out. A thorough cutaneous examination was undertaken which captured details on type, distribution and arrangement of primary lesions and secondary changes in patients. After overnight fasting, venous blood samples were collected from the subjects and were analysed for serum glucose, triglyceride and HDL-cholesterol.
Results: Metabolic syndrome in psoriasis was associated with higher age. Gender wise male preponderance was observed. Among the psoriasis cases, 64% had metabolic syndrome whereas among the control subjects 48% had the condition (p-value 0.158). The mean for serum triglyceride level for psoriasis patients (159.42 mg/dL) was higher than controls (144.25 mg/dL). Forty six percent of cases fulfilled elevated triglycerides ≥150 mg/dl as a criterion of metabolic syndrome, compared to 40% of controls.
Conclusions: We observed a higher frequency of metabolic syndrome among psoriasis cases in a northern Indian population. An association of dyslipidemia with psoriasis was also noted. Routine screening of the condition to facilitate early diagnosis and treatment should be undertaken.

Keywords: Fasting glucose, Hypertension, Lipid profile, Metabolic syndrome, Waist circumference

INTRODUCTION

Psoriasis is a chronic inflammatory skin disease that affects about 3% of the population across the globe.[1] A few studies have estimated prevalence of metabolic syndrome to be 15-24% in the general population and 30-50% among psoriasis patients.[2] Psoriasis is associated with metabolic syndrome, independent of its severity.

Many co-morbidities have been found to be associated with psoriasis patients, including cardiovascular co-morbidities, metabolic syndrome and malignancies.[3,4]

An association exists between psoriasis and metabolic disorders and it is shown that severe psoriasis might be associated with increased mortality rate due to cardiovascular disorders.[5] Several factors like smoking,

alcohol, obesity, physical inactivity, homocysteinemia, and stress may contribute to cardiovascular risk in patients with psoriasis, all of which are more prevalent in patients with psoriasis.[6]

Various studies on psoriasis and metabolic syndrome have shown a large variation in their results. Apart from this, an increasing frequency is imposing a substantial burden on the overall health of psoriasis patients that needs to be appropriately foreseen and addressed. Therefore, this study was planned to study metabolic syndrome in patients with chronic plaque psoriatic disease in northern Indian region

METHODS

The present hospital-based case-control study was planned and executed by the Department of Dermatology in collaboration with Department of Pathology of a tertiary care teaching hospital of western Uttar Pradesh during April 2016 to March 2017.

Purposive sampling technique was adopted. A cohort of patients registering for treatment of chronic plaque psoriasis at Dermatology outpatients' department (OPD) during period of August 2015 to July 2016 formed the study population. From the study population those patients who fulfilled the inclusion criteria were considered as cases.

Inclusion criteria were patients with psoriasis more than 18 years of age and those with psoriasis of at least 6 months duration. Patients with psoriasis <18 years of age and those who have received cyclosporine or/and systemic retinoids therapy during the preceding one month formed the exclusion criteria. The age and sex matched controls were chosen from patients attending the dermatology OPD for disorders other than psoriasis. Study subjects currently on systemic steroids, immunosuppressants and systemic retinoids were excluded from the study.

Patient information sheets and hospital records also served as study tools. Detailed history was captured from the patients including age, gender, and history of smoking and alcohol intake, duration and severity of disease, history of treatment if any, exacerbations and remissions and other co-existing medical conditions. General physical examination was carried out for capturing relevant details like height, weight, body mass index, waist circumference, blood pressure etc. A thorough cutaneous examination was undertaken which captured details on type, distribution and arrangement of primary lesions and secondary changes in patients. After overnight fasting, venous blood samples were collected from the subjects and were analysed for serum glucose, triglyceride and HDL-cholesterol.

For the purpose of this study, chronic plaque psoriasis was considered localized or generalised when it covers less or more than 10% of the body surface area. Psoriasis area severity index (PASI) was also calculated. PASI was calculated as elucidated by Bhor U et al.[7] Four sites of affection, the head (h), upper limb (u), trunk (t) and lower limbs (l), were separately scored by using three parameters, erythema (E), infiltration (I) and desquamation (D), each of which was graded on a severity scale of 0-4, where 0 = nil, 1 = mild, 2 = moderate, 3 = severe and 4 = very severe. The area wise percentage involvement of the involved sites was calculated as: $1 \leq 10\%$ area; 2 = 10-29%; 3 = 30-49%; 4 = 50-69%; 5 = 70-89%; and 6 = more than 90%.

We followed criteria of National Cholesterol Education Program-Adult Treatment Plan III, with Asian modification for abdominal circumference for the diagnosis of metabolic syndrome in this study.[8] The criteria are: Increased waist circumference- In Asian populations, ≥ 90 cm in males and ≥ 80 cm in females; Raised triglycerides ≥ 150 mg/dl (or on treatment for raised triglycerides); Decreased HDL <40 mg/dL in men and <50 mg/dL in women (or on treatment for reduced HDL-c); Increased blood pressure systolic ≥ 130 and/or diastolic ≥ 85 mm Hg (or on treatment for hypertension) and Increased fasting glucose ≥ 100 mg/dL (or on treatment for increased blood glucose). The presence of any 3 or more of these 5 risk factors constitutes a diagnosis of MS.

The study adhered to the tenets of the declaration of Helsinki for research in humans. Informed consent was obtained from study subjects after discussing advantages and risks. Permission of institutional ethics committee (IEC) was sought before the commencement of the study. All the questionnaires along with other relevant data were manually checked and were then coded for computer entry. After compilation of the collected data, analysis was done using Statistical Package for Social Sciences (SPSS), version 21 (IBM, Chicago, USA).

The results were expressed using appropriate statistical methods. For normally distributed data, Students t-test was done to calculate statistical significance. For parameters whose distribution was skewed, Mann-Whitney U test was done for statistical significance. To detect statistically significant difference between the percentages of cases and controls testing positive for a particular parameter, chi-square test was done. A two-tailed p <0.05 was considered statistically significant.

RESULTS

Data of fifty clinically diagnosed adult patients of chronic plaque psoriasis and similar number of age- and sex-matched control subjects were subjected to final analysis. Thirty-eight (76%) the cases were literate whereas 40 (80%) the controls were literate. Regarding occupation of the cases, were 26% were farmers, 14% were labourers, 12% were housewives and remaining were drivers, construction workers, carpenter etc. In the control group,

housewives 13 (26%), construction workers/clerk/tailor 9 (18%) and shop owner/security guards 4 (8%) were the main occupation groups.

Approximately 90% of the cases belonged to the low-income group whereas nearly 80% of controls belong to low-income group. Gender wise male preponderance was observed in the present study.

Of the 50 cases, 39 had psoriasis vulgaris, 6 had psoriatic erythroderma and 4 patients had palmoplantar psoriasis and one patient had acute generalized pustular psoriasis. Of the 39 cases with psoriasis vulgaris, psoriasis was stable in 35 patients and unstable in 4 patients (Figure 1).

Mean values of the different parameters of metabolic syndrome of both cases and controls were compared.

The presence of metabolic syndrome in psoriasis was significantly associated with higher age of the patients (mean age in patients with and without metabolic syndrome was 57.72±12.11 years and 47.05±12.83 years, respectively, P = 0.043).

The mean differences between the cases and controls of the 2 groups were statistically not significant in other parameters like cholesterol levels, triglyceride levels, HDL, LDL, VLDL and FBS etc (Table 1).

Table 1: Comparison of different parameters of metabolic syndrome between cases and controls.

Parameter	Controls		Cases		p-value
Age (years)	47.05	12.83	57.72	12.11	0.043
BMI (kg/m2)	22.04	5.01	23.96	5.28	0.275
FBS (mg/dL)	137.73	56.98	121.04	39.09	0.414
Systolic BP (mm of Hg)	123.97	15.46	122.04	15.24	0.526
Diastolic BP (mm of Hg)	79.28	12.03	80.16	11.53	0.775
Waist circumference (cm)	90.46	12.22	86.74	9.08	0.366
HDL (mg/dL)	40.03	8.98	38.45	9.82	0.483
LDL (mg/dL)	108.87	26.34	101.85	23.65	0.638
VLDL (mg/dL)	25.16	7.64	28.83	12.94	0.255
Triglyceride (mg/dL)	144.25	80.28	159.42	96.64	0.376
Total cholesterol (mg/dL)	165.88	35.27	153.46	29.95	0.742

Table 2: Comparison of prevalence of metabolic syndrome among cases and controls.

Metabolic syndrome	Psoriatic patients		Total
	Cases	Controls	
Present	32 (64)	24 (48)	56 (112)
Absent	18 (36)	26 (52)	44 (88)
Total	50 (100)	50 (100)	100 (200)

Figures in parenthesis indicate percentage $\chi2$ =1.989, df =1, p=0.158

Among the psoriasis cases, 32 (64%) had metabolic syndrome whereas among the control subjects 24 (48%) had the condition. The difference between the prevalence in the 2 groups was not statistically significant (p-value 0.158) (Table 2). Data presented in table 3 shows the proportion of cases and controls fulfilling each of the criteria of National Cholesterol Education Program-Adult Treatment Plan III, with Asian modification for abdominal circumference. Statistically significant difference was noted in only one criterion i.e. reduced HDL-c levels (p-value 0.042) (Table 3).

Table 3: Comparison between percentages of cases and controls fulfilling each of the criteria of metabolic syndrome.

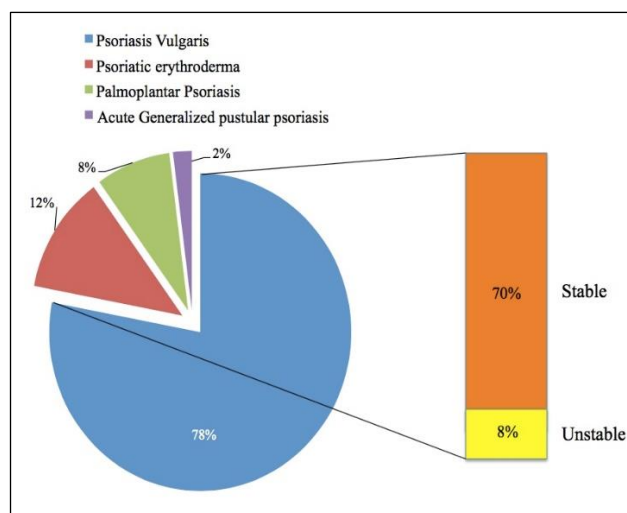| Parameter	Cases		Controls		p-value
	Number (out of 50)	Percentage (%)	Number (out of 50)	Percentage (%)	
FBS> 100 mg/dl	28	56%	33	66%	0.776
Reduced HDL-c levels	42	84%	29	58%	0.042*
Elevated serum TG	23	46%	20	40%	0.615
Elevated BP	19	38%	17	34%	0.862
Increased waist circumference	25	50%	28	56%	0.515

Figure 1: Distribution of pattern of chronic plaque psoriatic cases.

DISCUSSION

Psoriasis is a chronic inflammatory disease that is coupled with substantial impairment in health-related quality of life. Based on an increasing understanding of its immune pathophysiology, psoriasis is now thought to be a systemic disease with potential health implications. Although the exact pathogenic mechanism is not known, certain proinflammatory cytokines like TNFα, IL-6 that are found in psoriatic plaques are known to contribute to features of metabolic syndrome such as hypertension, dyslipidemia and insulin resistance.

The mean age of psoriasis patients without metabolic syndrome in our study was 47.05±12.83 years. Metabolic syndrome in psoriasis was associated with higher age in our study. This figure is almost at par with findings of various other Indian and overseas studies.[9-12] Another study from Korea found the prevalence of metabolic syndrome in patients older than 53 years age.[13] Another hospital-based study found metabolic syndrome in psoriasis was more common after 40 years of age.[1]

Gender wise male preponderance was observed in this study. The result of this study is in agreement with previous study from United Kingdom.[12] Another two studies from Pondicherry are also in concordance with our observations.[10,14] But this is in contrast to the study by Zindancı I et al. from Turkey.[6]

Regarding distribution pattern of psoriatic cases, in our study out total 50 cases, 39 had psoriasis vulgaris, 6 had psoriatic erythroderma and 4 patients had palmoplantar psoriasis and one patient had acute generalized pustular psoriasis. Of the 39 cases with psoriasis vulgaris, psoriasis was stable in 35 patients and unstable in 4 patients. Our findings confirm the results of another study from South India.[10] In that study of the 40 cases, 36 had psoriasis vulgaris, two had psoriatic erythroderma and

one patient each had acute generalized pustular psoriasis and palmoplantar psoriasis. Of the 36 cases with psoriasis vulgaris, psoriasis was stable in 33 patients and unstable in 3 patients.

Metabolic syndrome is more frequently seen in higher socio-economic classes. But recent research points towards its progression in the middle socio-economic class also. Such finding was recorded by Gupta R et al in his study on burden of cardiovascular risk factors in the urban middle-class residents of Rajasthan.[15] Approximately 90% of the cases belonged to the low-income group whereas nearly 80% of controls belong to low-income group. It's possible that lower socio-economic status of our study subjects may have lowered the actual prevalence of metabolic syndrome in the present study population.

Among the psoriasis cases, 32 (64%) had metabolic syndrome whereas among the control subjects 24 (48%) had the condition. This observation is in agreement with many studies, which have shown a significantly higher prevalence of metabolic syndrome among psoriasis patients compared to controls.[6,10,14] However, this finding may not be comparable with the investigations done in different geographical milieu viz. Bangalore, Kashmir and Mumbai, as they did not use the Asian modification for waist circumference.[10,16,17]

In the present study, the mean for serum triglyceride level for psoriasis patients (159.42 mg/dL) was higher than controls (144.25 mg/dL). Forty six percent of cases fulfilled elevated triglycerides ≥150 mg/dl as a criterion of metabolic syndrome, compared to 40% of controls. Several other studies have demonstrated higher lipid levels in psoriasis. Dreiher et al from Israel found a significant increase in lipid levels among psoriasis patients than in controls.[18] Two studies from South India observed a significantly higher triglyceride levels in psoriasis patients compared to controls without any significant difference in HDL levels.[9,16] Observations of Lakshmi S et al are contradictory in this aspect. She observed a higher average triglyceride level among the patients compared to controls, even though it was not statistically significant. That study also showed paradoxically higher average HDL level among psoriasis patients compared to controls.[10] Lower HDL levels in cases could be due to a sedentary lifestyle.

CONCLUSION

We observed a higher frequency of metabolic syndrome among psoriasis cases in a northern Indian population. An association of dyslipidaemia with psoriasis was also noted. Routine screening of the condition to facilitate early diagnosis and treatment should be undertaken. This study failed to demonstrate significant association of psoriasis with abdominal obesity, hypertension and raised blood glucose. Higher levels of low HDL levels indicate the need for counselling of patients regarding healthy life

style and regular exercise. Community based programs for raising health awareness and lifestyle modification are warranted.

REFERENCES

1. 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;157:68-73.
2. Schön MP, Boehncke WH. Psoriasis. N Engl J Med. 2005;352:1899-912.
3. Myers WA, Gottlieb AB, Mease P. Psoriasis and psoriatic arthritis: clinical features and disease mechanisms. Clin Dermatol. 2006;24:438-47.
4. Gottlieb AB, Chao C, Dann F. Psoriasis comorbidities. J Dermatolog Treat. 2008;19:5-21.
5. Mallbris L, Ritchlin CT, Ståhle M. Metabolic disorders in patients with psoriasis and psoriatic arthritis. Current Rheumatol Rep. 2006;8(5):355-63.
6. Zindancı I, Albayrak O, Kavala M. Prevalence of metabolic syndrome in patients with psoriasis. Sci World J. 2012;2012:312463.
7. Bhor U, Pande S. Scoring systems in dermatology. Indian J Dermatol Venereol Leprol. 2006;72:315-21.
8. Alberti KG, Eckel RH, Grundy SM, Zimmet PZ, Cleeman JI, Donato KA, et al. Harmonizing the metabolic syndrome: a joint interim statement of the International Diabetes Federation Task Force on Epidemiology and Prevention; National Heart, Lung, and Blood Institute; American Heart Association; World Heart Federation; International Atherosclerosis Society; and International Association for the Study of Obesity. Circ. 2009;120:1640-5.
9. Madanagobalane S, Anandan S. Prevalence of metabolic syndrome in South Indian patients with psoriasis vulgaris and the relation between disease severity and metabolic syndrome: a hospital-based case-control study. Indian J Dermatol. 2012;57:353-7.
10. Lakshmi S, Nath AK, Udayashankar C. Metabolic syndrome in patients with psoriasis: A comparative study. Indian Dermatol Online J. 2014;5:132-7.
11. Love TJ, Qureshi AA, Karlson EW, Gelfand JM, Choi HK. Prevalence of the metabolic syndrome in psoriasis: results from the National Health and Nutrition Examination Survey, 2003-2006. Arch Dermatol. 2011;147:419-24.
12. 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.
13. Kim GW, Park HJ, Kim HS, Kim SH, Ko HC, Kim BS, et al. Analysis of cardiovascular risk factors and metabolic syndrome in Korean patients with psoriasis. Ann Dermatol. 2012;24:11-5.
14. Praveenkumar U, Ganguly S, Ray L, Nanda SK, Kuruvila S. Prevalence of metabolic syndrome in psoriasis patients and its relation to disease duration: a hospital-based case-control study. JCDR. 2016;10(2):WC01.
15. Gupta R, Sharma KK, Gupta A, Agrawal A, Mohan I, Gupta VP, et al. Persistent high prevalence of cardiovascular risk factors in the urban middle class in India: Jaipur heart watch-5. J Assoc Phy India. 2012;60:11-6.
16. Nisa N, Qazi MA. Prevalence of metabolic syndrome in patients with psoriasis. Indian J Dermatol Venereol Leprol. 2010;76:662-5.
17. Pereira RR, Amladi ST, Varthakavi PK. A study of the prevalence of diabetes, insulin resistance, lipid abnormalities, and cardiovascular risk factors in patients with chronic plaque psoriasis. Indian J Dermatol. 2011;56:520-6.
18. Dreiher J, Weitzman D, Davidovici B, Shapiro J, Cohen AD. Psoriasis and dyslipidaemia: a population-based study. Acta Derm Venereol. 2008;88:561-5.

Cite this article as: Jain SK, Jain P, Singh A, Goel S. Metabolic syndrome in patients with chronic plaque psoriatic disease: a case-control study from western Uttar Pradesh, India. Int J Res Med Sci 2018;6:688-92