ORIGINAL RESEARCH PAPER

Dermatology

PREVALENCE OF METABOLIC SYNDROME IN PSORIASIS PATIENTS AND ITS RELATION TO DISEASE DURATION

KEY WORDS: Psoriasis, metabolic syndrome, hypertension, dyslipidemia

Dr Raagita Sharma* — 3rd year Postgraduate student*Corresponding Author

Dr Yashshavani Dass — Senior resident

Dr Naina Kala Dogra — Associate Professor

ABSTRACT

Introduction: Psoriasis is a chronic inflammatory skin disease affecting approximately 1-3% of the world population.1 In India, the prevalence of psoriasis varies from 0.8- 1.4%. 2,3 It is more common in males as compared to females and most of the patients are in their second to fourth decade at the time of presentation.4 Psoriasis is a disease of long duration and can have association with metabolic syndrome. There is limited data on this association from the Indian subcontinent. **Aim:** To compare the prevalence of metabolic syndrome in psoriasis patients and controls and to determine association of metabolic syndrome with disease duration.**Materials and Methods:** A hospital based case control study was conducted on 105 psoriasis patients and 105 controls matched for age and sex. Diagnosis of metabolic syndrome was made by presence of three or more of the South Asian Modified National Cholesterol Education Program's Adult Panel III SAM-NCEP criteria. Statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS version 20.0). Data was compared between cases and controls. **Results:** There was increased incidence of metabolic syndrome in psoriatic patients compared to controls (37.1% vs 5.7%, p-value<0.001). Psoriatic patients had higher prevalence of hypertriglyceridemia (50.5% vs 23.8), abdominal obesity (39.0% vs 24.8%), elevated blood pressure (36.2% vs 2.9%) and elevated blood sugar level (35.2% vs 8.6%) with exception of decreased HDL cholesterol (46.7% vs 42.9%). Metabolic syndrome was not related to duration of psoriasis (p-value =0.669). Limitations: The study was cross sectional and causality could not be assessed. Hospital based controls were taken leading to selection bias.**Conclusion:** There was significant association between psoriasis and metabolic syndrome and it was independent of disease duration. Therefore, all patients of psoriasis should be screened for metabolic syndrome to prevent morbidity and mortality.

Introduction

Psoriasis is a chronic inflammatory disease. It presents with erythematous scaly plaques, distributed mainly over the extensor surfaces of limbs, trunk. There is also involvement of nails, scalp and joints.

It is an immune mediated disorder. There is hyperproliferation of keratinocytes in the skin which is mediated by various inflammatory mediators. Both types of T – cells including CD4 and CD8 cells are present in the skin of psoriatic patients.[5] The main inflammatory mediators are TNF-alpha, IFN-gamma, IL-17, IL-23.[6]

There is also increased levels of angiotensin converting enzyme, endothelin-1 and renin in psoriasis patients which can cause hypertension.[7]

TNF-alpha causes production of inflammatory cytokines which can lead to cell signalling via interaction with TNF-alpha receptor and lead to insulin resistance.[8]

Many studies have shown association of metabolic syndrome and its components with psoriasis.9 Therefore, the present study was undertaken to determine the association between metabolic syndrome and psoriasis and its relation with disease duration.

Materials and Methods:

A hospital-based case control study was undertaken in the Department of Dermatology, Venereology and Leprosy, GMC Jammu over a period of six months from June 2022 to December 2022 after taking approval from Institutional Ethics Committee. 105 psoriatic patients and 105 controls matched for age and sex were enrolled in the study. (Taking the sample size was calculated according to prevalence of psoriasis)

INCLUSION CRITERIA:

1. For cases, age >/=18 years with diagnosis of chronic plaque psoriasis (duration at least 6 months).

2. For controls, age >/= 18 years with other dermatological conditions (scabies and tinea infections).

EXCLUSION CRITERIA:

1. Psoriasis patients receiving any systemic or local treatment for the last four weeks.

2. Patients with other skin disorders associated with metabolic syndrome such as acne vulgaris, hidradenitis suppurativa, androgenic alopecia, lichen planus.

3. Patients with pre-existing coronary artery disease, liver disease, renal disease, diabetes mellitus, hypertension.
4. Pregn
ancy.

A detailed information of patients including age, gender, weight, height, body mass index (BMI), waist circumference, occupation, duration of disease, course of disease, treatment history, concomitant illnesses, personal habits such as smoking, alcohol, family history of psoriasis, diabetes and cardiovascular disease were taken. All patients were examined and extent, severity of disease, presence of nail, joint involvement were noted. Duration of disease was classified as less than 5 years and more than/equal to 5 years. Severity of psoriasis was assessed according to the Psoriasis Area and Severity Index (PASI), and Body Surface Area (BSA) measurement. PASI score of <7, 7-12 and >12 was taken as mild, moderate and severe disease respectively. BMI was calculated as weight(kg)/height(m2). Waist circumference was measured at the midpoint between lowest rib and iliac crest in the standing position. Blood pressure was recorded as

the average of two measurements after subjects were sitting for five minutes.

Metabolic syndrome was diagnosed using the SAM-NCEP (South Asian Modified National Cholesterol Education Program's Adult Panel III) criteria, when three or more of the following were present:

1. Abdominal obesity (waist circumference >/=90 cm for males and >/=80 cm for females)
2. Blood pressure >130/85 mmHg
3. Fasting blood glucose >/=100 mg/dl
4. Hypertriglyceridemia >150mg/dl
5. Low HDL cholesterol (<40 mg/dl for males and <50mg/dl for females)

Fasting blood sugar, fasting lipids (HDL cholesterol and triglycerides) were measured from venous samples taken after 12 hours of overnight fasting.

Serum cholesterol and triglycerides were measured with enzymatic procedures and plasma glucose measured using glucose oxidase method.

Statistical Analysis

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean ± SD and categorical variables were summarized as frequencies and percentages. Student's independent t-test was employed for comparing continuous variables. Chi-square test was applied for comparing categorical variables. A P-value of less than 0.05 was considered statistically significant.

Results

The study included 105 psoriatic patients and 105 age and sex matched controls. The mean age of patients in psoriasis group and control group was 48.2±16.39 years and 47.4±14.19 years respectively. Psoriatic patients were between 18-83 years of age with maximum number of patients (n=24) in fourth decade. (Table 1, Figure 1)

There were 76 (72.4%) male patients and 29 (27.6%) female patients in psoriasis group. There were 67 (63.8%) male patients and 38 (36.2%) female patients in control group. (Table 2, Figure 2)

54 patients had duration of psoriasis less than 5 years and 51 patients had long standing disease (>5 years) at time of enrolment in study. Patients had PASI scores ranging from 2.2 to 24.2. Forty five (42.8%) had mild psoriasis (PASI<7), forty two (40%) had moderate psoriasis (PASI 7-12) and eighteen (17.1%) had severe psoriasis (PASI>12). For statistical analysis of data, PASI score was divided into two groups, PASI mild to moderate group (n=87) and PASI severe group (n=18). Nail involvement was seen in 66 (62.8%) psoriasis patients. The most common nail finding were pitting and leukonychia seen in 45 (42.9%) and 7 (6.7%) cases respectively. Oil drop change and subungal hyperkeratosis were seen in 4 (3.8%) and 3 (2.9%) cases respectively. (Table 3, Figure 3)

Joint involvement was seen in 52 (49.5%) psoriasis patients. The most common joint involved in psoriasis cases were knee and ankle joint in 29 (27.6%) and 9 (8.6%) of cases respectively. Elbow, wrist and MCP joints were involved in 8 (7.6%), 3 (2.9%) and 3 (2.9%) of cases respectively. (Table 4, Figure 4)

Components Of MS And Psoriasis

In psoriasis group 39 (37.1%) patients had MS, while in control group, 6 (5.7%) had MS. (p value <0.001, statistically significant) (Table 5, Figure 5)

There was a positive correlation between the presence of deranged cholesterol, abdominal obesity, increased blood pressure and deranged fasting blood sugar in psoriasis group compared to controls (p value <0.001, 0,026, <0.001 and <0.001 respectively). There was negative correlation between reduced HDL cholesterol and psoriasis. (p value = 0.579) (Table 6, Figure 6)

MS and Duration of Psoriasis

MS was present in 19 (35.2%) cases with disease duration less than 5 years and in 20 (39.2%) cases with disease duration more than 5 years. (Table 7, Figure 7)

In our study, there was no significant difference seen with respect to duration of psoriasis and occurrence of MS (p value= 0.069)

Components of MS and duration of Psoriasis

Obesity was present in 18 (33.3%) cases, deranged triglycerides in 31 (57.4%), reduced HDL in 29 (53.7%), elevated blood pressure in 19 (35.2%) and deranged fasting blood sugar in 21 (38.9%) of cases respectively.

Obesity was present in 23 (45.1%) cases, deranged triglycerides in 22 (43.1%), reduced HDL in 20 (39.2%), elevated blood pressure in 19 (37.3%) and deranged fasting blood sugar in 16 (31.4%) of controls respectively. (Table 8, Figure 8)

In our study, there was no significant difference seen with respect to duration of psoriasis and occurrence of different components of MS including obesity, deranged triglycerides, reduced HDL, elevated blood pressure and deranged fasting sugar (p- value= 0.217, 0.143, 0.137, 0.825 and 0.421 respectively).

Tables and Graphs

Table 1: Age distribution of study patients in two groups

Age (Years)	Cases	Controls			P-value
	No.	%age	No.	%age	
≤ 30	15	14.3	17	16.2	0.706
31-40	24	22.9	22	21.0	
41-50	20	19.0	23	21.9	
51-60	18	17.1	17	16.2	
61-70	19	18.1	18	17.1	
> 70	9	8.6	8	7.6	
Total	105	100	105	100	
Mean±SD (Range)	48.2±16.39 (18-83)		47.4±14.19 (18-78)		

Figure 1 : Age distribution of study patients in two groups

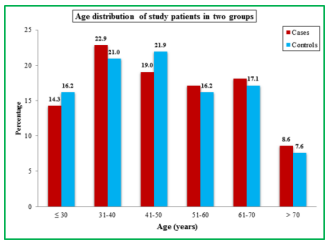


Table 2: Gender distribution of study patients in two groups

Gender	Cases		Controls		P-value
	No.	%age	No.	%age	
Male	76	72.4	67	63.8	0.183
Female	29	27.6	38	36.2	
Total	105	100	105	100	

Figure 2 : Gender distribution of study patients in two groups

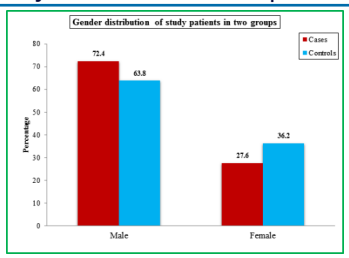


Table 3: Nail involvement in psoriatic patients

Nail Involvement	Number	Percentage
Pitting	45	42.9
Leukonychia	7	6.7
Oil drop change	4	3.8
Subungal hyperkeratosis	3	2.9
Longitudinal melanonychia	3	2.9
Distal onycholysis	2	1.9
Longitudinal ridges	2	1.9

Figure 3: Nail involvement in psoriatic patients

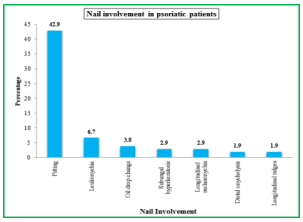


Table 4 : Joint involvement in psoriatic patients

Joint Involvement	Number	Percentage
Knee	29	27.6
Ankle	9	8.6
Elbow	8	7.6
Wrist	3	2.9
MCP	3	2.9

Figure 4 : Joint involvement in psoriatic patients

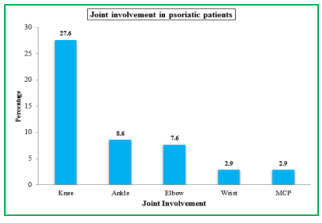


Table 5: Prevalence of metabolic syndrome in cases and controls

Metabolic Syndrome	Cases		Controls		P-value
	No.	%age	No.	%age	
Present	39	37.1	6	5.7	<0.001*
Absent	66	62.9	99	94.3	
Total	105	100	105	100	

*Statistically Significant Difference (P-value<0.05)

Figure 5: Prevalence of metabolic syndrome in cases and controls

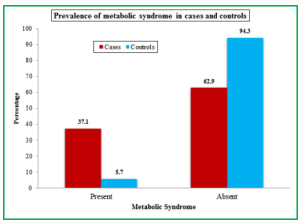


Table 6 : Comparison of different components of metabolic syndrome in cases and controls

Parameter	Cases		Controls		P-value
	No.	%age	No.	%age	
Increased waist circumference	41	39.0	26	24.8	0.026*
Deranged TG	53	50.5	25	23.8	<0.001*
Reduced HDL	49	46.7	45	42.9	0.579
Elevated BP	38	36.2	3	2.9	<0.001*
Deranged BSF	37	35.2	9	8.6	<0.001*

Statistically Significant Difference (P-value<0.05)

Figure 6 : Comparison of different components of metabolic syndrome in cases and controls

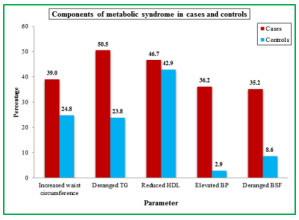


Table 7 : Association of metabolic syndrome with the duration of psoriasis

Metabolic Syndrome	Duration of disease				P-value
	< 5 Years [n=54]	≥ 5 Years [n=51]			
	No.	%age	No.	%age	
Present	19	35.2	20	39.2	0.669
Absent	35	64.8	31	60.8	
Total	54	100	51	100	

Figure 7 : Association of metabolic syndrome with the duration of psoriasis

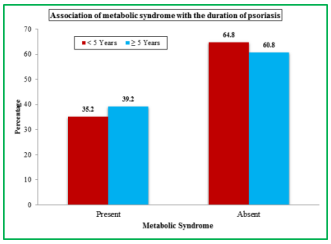
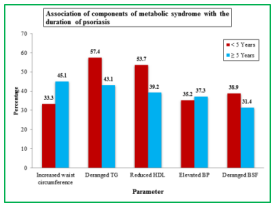


Table 8 : Association of components of metabolic syndrome with the duration of psoriasis

Parameter	Duration of disease				P-value
	< 5 Years [n=54]		≥ 5 Years		
	No.	%age	No.	%age	
Increased waist circumference	18	33.3	23	45.1	0.217
Deranged TG	31	57.4	22	43.1	0.143
Reduced HDL	29	53.7	20	39.2	0.137
Elevated BP	19	35.2	19	37.3	0.825
Deranged BSF	21	38.9	16	31.4	0.421

Figure 8 : Association of components of metabolic syndrome with the duration of psoriasis



Discussion

Psoriasis is a chronic disease and therefore is associated with significant morbidity. There are various inflammatory mediators such as IL-6, TNF-alpha, plasminogen activator inhibitor type 1, leptin and adiponectin produced by adipocytes, which play a role in inflammation, metabolism and endothelial cell function.[10]

Our study showed that MS is more prevalent in psoriasis patients (37.1%) as compared to age and gender matched controls (5.7%). Similarly, in a study done in Maharashtra by Salunke A.S et al in 2017, it was observed that MS was more prevalent in patients of psoriasis (38.9%) as compared to age and gender matched controls (21.05%).[11]

Prevalence of MS and its individual components varies in different populations. It can depend on racial and ethnic differences, daily habits, age, sex.

In this study, it was found that all components of MS were significantly correlated with psoriasis except HDL cholesterol. In another study done in 2011 by Pereira R et al., there was a positive association between insulin resistance and psoriasis but psoriasis was not related to dyslipidemia. 12 In our study MS was not related to duration of disease. There was also no correlation between duration of psoriasis and different components of metabolic syndrome. These findings were in line with study conducted in 2006 by Sommer DM et al., where it was observed that risk of developing DM, HTN and hyperlipidemia was not associated with duration of disease.[13]

Limitation

Our study was cross-sectional and could not determine directionality of association between MS and psoriasis. Causality could not be assessed. Controls selected were hospital based and could lead to selection bias.

Conclusion

The present study demonstrated the presence of MS in psoriasis patients. There was a positive correlation between all components of MS and psoriasis except deranged triglycerides. There was no correlation between duration of psoriasis and MS. Therefore, it is important that all patients of psoriasis to be evaluated at the initial visit for presence of MS and its components to prevent significant morbidity associated with it.

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