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Original Article

Psoriatic patients are associated with increased risk of developing metabolic syndrome: An institution based case control study

Ashim Kumar Mondal, Debabrata Bandyopadhyay*, Nilay Kanti Das, Rajarajan Thangaraj, Anupam Roy**

Department of Dermatology, Venereology and Leprosy, Burdwan Medical College and Hospital, Purba Bardhaman–713104, India.
* Department of Dermatology, Venereology and Leprosy, Medical College–Kolkata-700073, India.
** Department of Dermatology, Venereology and Leprosy, College of Medicine and Sagore Dutta Hospital–Kolkata, India.

Abstract

Objective This study aimed to find out the association of metabolic syndrome, risk factors, individual components of metabolic syndrome and the other related parameters in patients with psoriasis and compare it with non-psoriatic patients**.**

Methods Institution based case control study including 101 patients of psoriasis and 90 controls. Data analysis statistically done by using t-test/ ANOVA test or chi square/ Fischer's test.

Results In this study, we found strong correlation between types of psoriasis (plaque type 76.47% followed by erythrodermic type 14.71% of psoriatic patients with metabolic syndrome) and metabolic syndrome while no such association found with severity of psoriasis (PASI score), different demographic parameters with metabolic syndrome in both the groups. At the same time smoking and alcohol consumption were found to be significant risk factors for developing metabolic syndrome.

Conclusion In our study, there is a significantly higher prevalence of metabolic syndrome in patients with psoriasis comparing to non psoriatic population while it failed to show any significant association between psoriasis and dyslipidemia.

Key words
Psoriasis; Metabolic syndrome; PASI score.

Introduction

Psoriasis represents one of the commonest dermatological problems encountered by dermatologists in daily practice. As per, various published data, prevalence of psoriasis in different population varies from 1-3% worldwide.[1,2] In India, it varies from 0.44 to 2.8 and it is two times more common in males when compared to females, and the common age of presentation is 3rd or 4th decades of life.[3] Regarding its pathogenesis, Psoriasis is because of Th1cell mediated immune response, but recent advances shows that Th17 & Th22 cell population also expand and stimulate to release different pro inflammatory cytokines and interleukins (like IL17, IL22, TNF - α, INF - γ) which leads to inflammation in dermis and epidermal proliferation.[4,5] Current evidence also indicates that different pro inflammatory

Address for correspondence
Dr. Rajarajan Thangaraj,
Department of Dermatology, Venereology and Leprosy, Burdwan Medical College and Hospital, Purba Bardhaman–713104, India.
Ph: 9976142032
Email: gtrajan55@gmail.com

cytokines which take place in chronic inflammation are responsible for augmentation of artherogenesis and peripheral insulin resistance and thus leading to hypertension and type 2 diabetes mellitus.[6,7] Metabolic syndrome also known as Syndrome X, is a cluster of cardiovascular risk factors including central obesity, hypertension, glucose intolerance and dyslipidemia. The pathophysiology of metabolic syndrome is attributed to insulin resistance mediated by adipokines such as TNF- α, leptin and adiponectin.[8-10] Patient with decrease level of adiponectin show increased risk of developing diabetes, hypertension, dyslipidemia.[8,11] Thus, cutaneous psoriasis is just the tip of the iceberg and skin lesions may be considered as the marker of systemic illness. Although the number of reports regarding the relationship of psoriasis with metabolic syndrome is increasing in western countries, such reports are still rare from eastern India.

Materials and methods

After taking clearance from the institutional ethical committee, this case control study was conducted over a period of 12 months and the patients recruitment done for initial 9 months. During this time frame, total 17,847 patients attending the OPD of department of dermatology were screened. Out of them a total 136 cases of psoriasis were screened, and 35 patients were excluded (on the basis of inclusion and exclusion criteria). The age and sex matched non psoriatic individuals suffering from other dermatological diseases were recruited as control group. Inform consent was taken from all patients.

Thorough history taking, clinical examination, relevant biochemical investigations were done, and patient's characteristics were recorded in the case record form. The parameters of demographic profile like age, sex, religion, occupation, education, residence, and socio-economic status were noted from both the groups and correlation of these factors with metabolic syndrome was evaluated in both groups. Metabolic syndrome was diagnosed by the revised National Cholesterol Education Programme Adult Treatment Panel 3 (NCEP ATP 3) criteria.[12-14] This system defines metabolic syndrome as the presence of at least three or more of the following conditions:

1 Waist circumference > 40 inch (M), > 35 inch (F).

2 Serum Fasting Triglycerides >150mg/dl.

3 HDL cholesterol <40 mmol/dl (M), <50 mmol/dl (F).

4 Elevated blood pressure >130/85 mm of Hg.

5 Elevated fasting sugar >100mg/dl.

Severity of psoriasis was measured with PASI score and correlation of metabolic syndrome (and its components) with severity of psoriasis was evaluated in psoriatic group. Out of 101 psoriatic patients PASI score was evaluated only in 97 patients as the remaining 4 patients were suffering from Pustular psoriasis. Through general survey with special emphasis on blood pressure, measurement of waist circumference, weight, height, and BMI were calculated with appropriate measuring tools. Various samples were taken at the enrollment visit after the subject had fasted overnight (12 hours).

Descriptive statistics were expressed as Mean±SD, Median, Range, Frequencies (no of cases), and relative frequencies (percentages) whichever were appropriate. For analytical statistics continuous parametric data were analyzed using t-test or ANOVA (as applicable) and for categorical data chi-square test or

Fischer's test was used. Medical version 10.2 was used for statistical analysis and P value <0.05 was considered statistically significant.

Results

Among the 101 psoriatic patient group, 34 (33.66%) were found to have metabolic syndrome (according to NCEP ATP 3 criteria).[12-15] While in non-psoriatic (control group) only 17 had metabolic syndrome. The metabolic syndrome found to be significantly more common in psoriatic group compared to non-psoriatic group. In psoriatic group, 13.86% patients were habituated for alcohol consumption but in non psoriatic group the number was nearly half (7.78%). The difference in alcohol consumption habit was found to be comparable among both groups (P value=0.2670). 35.64% patients were habituated for smoking in the psoriatic group while on other group only 23.33% patients were habituated for smoking. The difference in smoking habit was found to be comparable among both groups (P value=0.0896). The comparison of demographic profile in patients of psoriasis with and without metabolic syndrome is given in **Table 1**.

The association of various clinical types of psoriasis and metabolic syndrome is given in **Table 2**.

The comparison of various biochemical parameters between cases and controls is given in **Table 3**.

Table 1

Parameters	*Patients with metabolic syndrome*	*Patients without metabolic syndrome*	*p value*
Age	46.94±12.57	40.57±14.44	0.0311
Sex	67.65% (M), 32.35% (F)	65.67% (M), 34.33% (F)	0.9806
Residency	50% (U), 50% (R)	41.79% (U), 58.21% (R)	0.5669
Religion	61.76% (H), 38.24% (M)	77.61% (H); 22.39 (M)	0.1481
Socio-economic status	70.59% (APL), 29.41% (BPL)	67.16% (APL), 32.84% (BPL)	0.9019
Education	14.7% (Illiterate); 85.3% (Literate)	11.94% (Illiterate); 88.06 (Literate)	0.8345
Occupation	58.82% (Sedentary); 23.53 (Moderate) 17.65 (Heavy)	59.7% (Sedentary); 13.43% (Moderate) 26.87% (Heavy)	0.6370

Table 2 Types of psoriasis and metabolic syndrome

Types of psoriasis	*With metabolic syndrome (n=34)*	*Without metabolic syndrome (n=67)*	*P value(Chi-square for trend)*
Plaque	26(76.47%)	54 (80.68%)	0.9759
Erythrodermic	5(14.71%)	3 (4.48%)	
Palmoplantar	2(5.88%)	5 (7.46%)	
Pustular	1(2.94%)	3 (4.48%)	
Guttate	0	1 (1.49)	
Inverse	0	1 (1.49%)	

Table 3 Biochemical parameters in cases vs. controls.

Biochemical parameters	*Psoriatic group*	*Non psoriatic group*	*P value*
Diabetic on medication (known)	7.92%	4.44%	0.4904
Hypertensive on medication (known)	7.92%	6.67%	0.9570
Dyslipidemia on medication (known)	8.91%	5.56%	0.5418
Abdominal obesity	18.81%	14.44%	0.5401
Hypertensive	34.65%	25.56%	0.2273
Increase Triglyceride	39.6%	45.56%	0.4939
Decrease HDL cholesterol	38.61%	43.33%	0.6066
Impaired Fasting plasma glucose level	51.48%	34.44%	0.0261

Discussion

As already mentioned this study was an institution-based case control study with the relative prevalence of psoriasis in our OPD attendees was 0.566%. Dogra and Yadav *et al.*[3] inferred in their article that in India, the prevalence of psoriasis varies from 0.44 to 2.8% according to previously published reports. The mean age at presentation in psoriatic group with metabolic syndrome was 46.94±12.57 compared to 40.57±14.44without metabolic syndrome and the difference was statistically significant (p value =0.2123). Nisa and Qazi *et al.*[16] found that the peak prevalence of the metabolic syndrome in psoriatic patient was in late second decade (12.9% vs. 0%) but we found higher prevalence of metabolic syndrome in middle aged patients. In our study, Psoriatic group, 33.66% patients were suffering from metabolic syndrome of which 67.65% were male and 32.35% were female. Though Nisa & Qazi *et al;*[16] Gisondi *et al.*[17] and Kim *et al.*[18] found no gender difference (P>0.05) in their study but Zindanci *et al.*[19] reported that the prevalence of the metabolic syndrome among women was higher in psoriatic group. In contrast, we found the higher prevalence of metabolic syndrome in males among both groups, and it was pretty high for psoriatic group, but it was not statistically significant (p >0.05). This may be due to higher prevalence of psoriasis among men in India. We also found no significant difference between the two groups when comparing those demographic profiles i.e. Religion, education, occupation, socio-economic status among the patients with metabolic syndrome and without metabolic syndrome.

In Psoriatic group, we found that predominant clinical type of psoriasis was plaque type (76.47%) followed by erythrodermic type (14.71%) in those who were suffering from metabolic syndrome. There was not statistically significant (p=0.9759) difference among clinical types of psoriasis with respect to metabolic syndrome. Like our observation Gisondi *et al.*[17] also found no statistically significant difference between clinical types of psoriasis and metabolic syndrome.

With the help of American Diabetes Association (ADA) and modified National Cholesterol education Programme Adult Treatment Panel 3 (NCEP ATP 3) criteria, we observed a higher prevalence of metabolic syndrome among psoriatic patients compare to non-psoriatic patients (33.66% vs. 18.89%, Odd's ratio (OR) =2.18, p value=0.0323). The data showed that psoriatic patients are at 2.18 times higher risk for developing metabolic syndrome than non-psoriatic patients. Our observation matched the result with Gisondi *et al.*[17] (30.1% vs20.6%, OR=1.65, p = 0.005). Our study also supports the two previous reported studies from India, one from Srinagar by Nisa and Qazi *et al.*[16] (28% vs. 6%, OR=6.09, p=0.05) and another on south Indian patients by Madanagobalane and Anandan *et al.*[20] (44.1% vs. 30%, p=0.025). So, we can conclude that in our population metabolic syndrome is more frequent in psoriatic patients similar to western countries and in other parts of India.

On exploring the risk factors, we found that alcohol consumption and smoking habit in psoriatic group vs. non psoriatic group were (13.86% vs. 7.78%, OR=1.91, p=0.0267) and (35.64% vs. 23.33%, OR=1.82, p=0.0896) respectively. In previous literatures, Gisondi *et al.*[17] and Zindanci *et al.*[19] showed higher frequency (p<0.05) of smoking rate within psoriatic patients. Similarly, smoking may be a precipitating factor or may be a result of chronic depression in psoriatic group.

Madanagobalane and Anandan *et al.*[20] found significant difference (P=0.035) in abdominal

obesity in south Indian patients but like our observation Nisa & Qazi *et al.*[16] found no significant (p>0.05) difference in abdominal obesity in another Indian study.

Hypertension is presumed to be an independent comorbidity of psoriasis as we found that 34.65% in psoriatic group and 25.56% in non-psoriatic group patients were hypertensive. So, the difference is comparable (p=0.2273, OR=1.54). Like Sommer *et al.*[7] and Chen *et al.*[21] various other studies showed that psoriatic patients had a significantly (p<0.05) increased association with hypertension. In contrast, Pereira *et al.*[22] and Madangobalane and Anandan *et al.*[20] showed that two groups did not differ (p >0.05) with regard to hypertension in Indian population.

We observed that the prevalence of elevated serum triglyceride and low HDL cholesterol among psoriatic patients were 39.6% and 38.61% respectively. In non-psoriatic group similar change in biochemical parameter were found in 45.56% and 43.33% of individuals respectively without any significant inter group difference (p>0.05) and the odd ratio was 0.78 and 0.82 respectively. Like our observation, Pereira *et al.*[22] found no significant (p>0.05) association between psoriasis and dyslipidemia. In contrast to our study, Nisa & Qazi *et al.*[16] and Madanagobalane and Anandan *et al.*[20] found psoriatic patients had a significantly (p<0.05) higher prevalence of hypertriglyceridemia but no statistically significant difference of HDL cholesterol level in two different Indian studies. So, we can conclude that association between psoriasis and dyslipidemia may vary in different parts of India. Previously published articles from India as well as from Western countries showed psoriatic patients had a significantly (p<0.05) higher prevalence of impaired fasting plasma glucose level. So, we also found similar link between psoriasis and impaired fasting plasma glucose. When we compare the BMI in psoriatic population with respect to metabolic syndrome, we found that mean BMI of patients with metabolic syndrome was 26.63.94 (range 15.82 to 36.2 and median value 26.57) and those without metabolic syndrome it was 23.42±3.49 (range 17.78 to 38.77 and median 23.44). The difference in BMI in respect to metabolic syndrome was found statistically significant (p=0.0001, unpaired t test). Our observation supports the observation of Herron *et al.*[23]

Finally, we compared the severity of psoriasis (PASI score) with respect to metabolic syndrome, and we found that mean PASI score of patients with metabolic syndrome was 18.04±14.99 and those without metabolic syndrome was 14.78±8.49. Though mean PASI score was high among those who were suffering from metabolic syndrome but inter group difference was found comparable (p=0.1743). Gisondi *et al.*[17] found no significant difference (p>0.05) in severity of psoriasis when comparing the psoriasis patients with respect to metabolic syndrome. Nisa & Qazi *et al;*[16] Madanagobalane and Anandan *et al.*[20] also noted similar findings (p>0.05) in two different studies from India. So, our observation support that in Indian psoriatic patients, metabolic syndrome does not correlate with severity of psoriasis. Correlating severity of psoriasis (PASI score) with different components of metabolic syndrome, we found the inter group difference between the two groups but statistically nonsignificant. Gisondi *et al.*[17] found mild but significant correlation between hypertriglyceridemia with PASI score (p=0.04) and Madanagobalane and Anandan *et al.*[20] also found significant (p=0.043) association between severity of psoriasis and elevated triglyceride in their large case control study. As the severity of psoriasis was mild in most of the patients in our study which may explain why there was no correlation between severity of psoriasis and

dyslipidemia.

Conclusion

Psoriasis may be a determining factor for development of metabolic syndrome and all patients must be screened for cardiovascular risk factors at the disease onset irrespective of the disease severity.

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