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Original Research Article

Prevalence of Metabolic Syndrome in Newly Diagnosed Psoriasis Patients: A Case Control Study from a Tertiary Care Hospital in Assam

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ABSTRACT

Background: Psoriasis is a chronic inflammatory and proliferative condition of the skin, characterized by scaly, sharply demarcated, indurated plaques, present particularly over extensor surfaces and scalp. Metabolic syndrome is a cluster of risk factors including central obesity, dyslipidemia, hypertension and glucose intolerance, and is a strong predictor of cardiovascular diseases, diabetes and stroke. Recent studies have shown that the prevalence of metabolic syndrome in psoriasis is significantly elevated.
Aim: To evaluate the prevalence of metabolic syndrome among newly diagnosed psoriasis patients.
Methods: The study comprised sixty new cases of psoriasis patients attending the outpatient of Department of Dermatology and Venereology from June 2012 to May 2013 and sixty healthy individuals as controls. Venous samples were taken at the first visit after the subjects had fasted overnight (at least 8 hours). Plasma glucose and lipid profile were estimated. Waist circumference and blood pressure were recorded. Participants with 3 or more criteria were defined as having metabolic syndrome according to South Asian Modified National Cholesterol Education Program Adult Treatment Panel III.
Results: In the psoriasis group, 16(26.66%) patients had metabolic syndrome, where as in the control group only 5 (8.33%) had metabolic syndrome, which showed a significant association with P= 0.016.
Conclusion: There was a significantly higher prevalence of metabolic syndrome in patients with psoriasis, which could play a relevant role in accelerating atherosclerosis. The association was not limited to severe cases but also occurs with mild cases. Therefore, the study emphasized the fact that for the better management and to prevent the future risk of cardiovascular complications, all patients must be screened for cardiovascular risk factors at the disease onset, irrespective of the severity of psoriasis. All patients with psoriasis should be encouraged to correct aggressively their modifiable cardiovascular risk factors.
Key-words: psoriasis, metabolic syndrome, obesity, atherosclerosis

INTRODUCTION

Psoriasis is a chronic inflammatory and proliferative condition of the skin, characterized by scaly, sharply demarcated, indurated plaques, present particularly over extensor surfaces and scalp. It affects about 3% of the population. [1] It has been reported to be associated with mortality from cardiovascular disease, and psoriasis may confer an independent risk of myocardial infarction. [2,3] Major factors that may contribute to this unfavorable cardiovascular risk profile include cigarette smoking, obesity, physical inactivity and psychological stress, which have a higher prevalence among patients with psoriasis. [4]

Metabolic syndrome is a cluster of risk factors including central obesity, dyslipidemia, hypertension and glucose intolerance, and is a strong predictor of cardiovascular diseases, diabetes and stroke. [5] Recent studies have shown that the prevalence of metabolic syndrome in psoriasis is significantly elevated. [6,7]

Similarities exist among psoriasis, the metabolic syndrome and atherosclerosis, with all three conditions characterized by an inflammatory process driven by the cytokines. [8,9]

This study was undertaken to evaluate the prevalence of metabolic syndrome in newly diagnosed psoriasis patients. Which is the first such kind of attempt in this part of the country.

METHODS

The study comprised sixty new cases of psoriasis patients attending the outpatient of Department of Dermatology and Venereology during one year period and sixty healthy individuals as controls. The approval from the institutional ethical committee and the consent from the study subjects were obtained prior to the study. Sixty clinically diagnosed new cases of Psoriasis were enrolled in the study. The demographic, biometric and the other relevant data which include age, gender, weight, height, body mass index (BMI), waist circumference, blood pressure, smoking habit, age of disease onset, type, severity, presence and distribution of psoriatic arthropathy, concomitant medications were noted. BMI was calculated as weight (kg)/height (cm2). Waist circumference was determined by locating the upper hip bone and placing a measuring tape at the level of the uppermost part of the hipbone around the abdomen. Blood pressure was recorded as the average of two measurements in 5 min interval. Severity of psoriasis was assessed according to Psoriasis Area and Severity Index (PASI) and Body surface area (BSA). The findings were recorded in the preformed porforma.

According to the revised NCEP ATP III criteria, participants with 3 or more of the following criteria were defined as having the metabolic syndrome:

1. Abdominal obesity (waist circumference, >90 cm in men and >80 cm in women)
2. Hypertriglyceridemia (triglycerides, ≥150 mg/dl)
3. Low levels of high-density lipoprotein cholesterol (<40 mg/dl in men and <50 mg/dl in women)
4. High blood pressure (≥130/85 mm Hg) and
5. High fasting glucose levels (≥100 mg/dl).

Clinically diagnosed new cases of psoriasis in the age group of 15-50 years were included in the study. Exclusion criteria include the following:

- Subjects not willing to take part in the study or unwilling to give their consent for the study.
- Patients with a past history of systemic or topical treatment for psoriasis.
- Subjects above 50 years.
- Subjects with family history and/or history of diabetes, hypertension or dyslipidemia.
- Subjects taking systemic drugs that are likely to interfere with the lipid profile or sugar profile.

A detailed history was taken pertaining to the duration of psoriasis, treatment taken for psoriasis, family history of psoriasis, occupation, drug intake other than for psoriasis, personal history of diabetes, hypertension, cardiac events and smoking. All the patients were subjected to general physical and cutaneous examinations including height and weight. All the patients graded according to Psoriasis Area Severity Index (PASI) into 3 categories – Mild(<8), Moderate(8-12) and Severe(>12).

Venous samples were taken at the first visit after the subjects had fasted overnight (at least 8 hours). Plasma glucose was tested by glucose oxidase method. Serum total cholesterol and triglyceride (S.TG) were determined by enzymatic method. Serum HDL Cholesterol (S.HDL-Ch) was estimated by phosphotungsate method. Serum VLDL cholesterol was calculated by the formula VLDL = S.TG/5 and Serum LDL cholesterol was measured by Friedwald's equation if less than 400 mg/dl or by direct enzymatic method if greater than 400 mg/dl.

Case control statistical analysis was carried out in the present study. Results on continuous measurements are presented on Mean±SD and results on categorical measurements are presented in Number (%). Significance is assessed at 5% level of significance. Analysis of variance (ANOVA) has been used to find the significance of study parameters between three or more groups of patients, Chi-square/2x3 Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups and independent sample t-test has been used to compare the continuous measurements. The statistical softwares namely SPSS 20.0 and Instat were used for the analysis of the data and Microsoft word and Excel have been used to generate tables and graphs.

RESULTS

The mean age of cases was 30.4± 8.43 years, while the mean age of the control group was 29.74±6.78 years. There was no significant difference (P= 0.643) in the age in both the groups and were age matched.

Of the 60 cases in our study, 46 were males and 14 were females. The ratio of males and females is 3.28:1. Amongst the control group 48 were males and 12 were females, ratio being 4:1. Both the groups were sex matched (P= 0.658). Duration of the disease ranged from 1 month to 2 years with a mean of 7.17 ± 6.02 months. The mean age of onset was 30.08 ± 8.06 years.

The mean BMI in cases and controls were 25.31 ± 3.23 kg/m2 and 24.87± 2.30 kg/m2 respectively with no significant difference between the two groups (P value=0.388).

Out of the 60 patients (Table 1), 51 had Psoriasis vulgaris (85%), 4 had Guttate type of psoriasis (6.66%), 2 had Erythrodermic psoriasis (3.33%), 2 had Pustular psoriasis (3.33%) and 1 patient had Palmoplantar psoriasis (1.67%). Of the 60 patients that were selected for the study, 7 patients (11.66%) had psoriatic arthritis. And the remaining 53(86%) patients did not show any joint involvement.

The severity of psoriasis was graded according to the PASI score. According to PASI, out of 60 patients, 11(18.33%) had mild psoriasis (PASI <8), 19(31.66%) had moderate (PASI 8-12) whereas 30(50%) patients had severe psoriasis (PASI >10).

In the psoriasis group (Table 2), 16(26.66%) patients had metabolic syndrome, where as in the control group only 5 (8.33%) had metabolic syndrome, which shows a significant association with P= 0.016. Abdominal obesity was seen in 13(21.66%) and 7(11.67%) [P=0.221], hypertriglyceridemia in 18(30%) and 14(23.33%) [P=0.536], low levels of High Density Lipoprotein in 37(61.67%) and 27(45%) [P=0.039], hypertension in 11(18.33%) and 5(8.33%) [P=0.179] and elevated fasting blood sugar in 16(26.66%) and 6(10%) [P=0.034], respectively in psoriasis group and control group. There was a significant association of elevated fasting blood sugar in both the groups, where as other components of metabolic syndrome showed no significant association.

Out of the 11 patients who had mild disease, 4(36.36%) had metabolic syndrome, 19 patients who had moderate disease, 3(15.8%) had metabolic syndrome and out of 30 patients who had severe disease, 9(30%) had metabolic syndrome. The P value was 0.718 indicating that the metabolic syndrome is not associated with the severity of Psoriasis. Similarly abdominal obesity, hypertryglyceridemia, low HDL, hypertension and raised fasting blood sugar showed no significant difference with the severity of the disease (P=0.456, 0.184, 0.104, 0.450 and 0.804 respectively).

Table No. 1 TYPE OF PSORIASIS

TYPE OF PSORIASIS	NO. OF PATIENTS	%
1) Psoriasis vulgaris	51	85
2) Guttate psoriasis	4	6.66
3) Erythrodermic psoriasis	2	3.33
4) Pustular psoriasis	2	3.33
5) Palmoplantar psoriasis	1	1.67

Table No. 2 METABOLIC SYNDROME AND ITS COMPONENTS

METABOLIC SYNDROME AND ITS COMPONENTS	Psoriasis Vulgaris (n = 51)	Guttate Psoriasis (n = 4)	Erythrodermic Psoriasis (n =2)	Pustular Psoriasis (n = 2)	Palmoplantar Psoriasis (n = 1)	Total
Metabolic syndrome	14	2	0	0	0	16
Waist circumference >90cm(M) or >80cm(F)	12	1	0	0	0	13
Triglycerides (>150mg/dl)	17	1	0	0	0	18
HDL <40(M) <50(F)	33	2	1	1	0	37
Blood pressure (>130/85mmHg)	10	1	0	0	0	11
Fasting blood sugar (>100mg/dl)	12	2	1	0	1	16

Table No. 3 RELATION BETWEEN DISEASE SEVERITY AND METABOLIC SYNDROME.

CHARACTERISTIC	CASES (N =60)		CONTROLS (N=60)		P VALUE
	NO.	%	NO.	%	
Metabolic syndrome	16	26.66	5	8.33	0.016
Waist circumference >90cm(M) or >80cm(F)	13	21.66	7	11.67	0.221
Triglycerides (>150mg/dl)	18	30	14	23.33	0.536
HDL <40(M) <50(F)	37	61.67	27	45	0.099
Blood pressure (>130/85mmHg)	11	18.33	5	8.33	0.179
Fasting blood sugar (>100mg/dl)	16	26.66	6	10	0.034

Table. 4. TYPES OF PSORIASIS AND METABOLIC SYNDROME

METABOLIC SYNDROME AND ITS COMPONENTS	PASI				P
	Mild (n=11)	Moderate (n=19)	Severe (n=30)	Total	VALUE
Metabolic syndrome	4	3	9	16	0.718
Waist circumference >90cm(M) or >80cm(F)	3	3	7	13	0.456
Triglycerides (>150mg/dl)	4	4	10	18	0.184
HDL <40(M) <50(F)	7	12	18	37	0.104
Blood pressure (>130/85mmHg)	2	3	6	11	0.450
Fasting blood sugar (>100mg/dl)	5	2	9	16	0.804

Out of the 16 patients who had metabolic syndrome, (Table 3) 14(87.5%) had psoriasis vulgaris and 2(12.5%) patients had guttate type of psoriasis. Among the 13 patients who had abdominal obesity, 12(92.3%) were of psoriasis vulgaris type and 1(7.7%) was of guttate type of psoriasis. Eighteen patients who had hypertriglyceridemia, out of which 17(94.44%) had psoriasis vulgaris and 1(5.55%) had guttate psoriasis. Out of the 11 patients who had hypertension, 10(90.1%) had psoriasis vulgaris and 1(9.9%) had guttate psoriasis. None of the patient with erythrodermic psoriasis, pustular psoriasis and palmoplantar psoriasis was found to have metabolic syndrome, abdominal obesity, hypertriglyceridemia or hypertension.

Out of the 37 patients who had low levels of HDL, 33(89.12%), 2(5.4%), 1(2.7%) and 1(2.7%) had psoriasis vulgaris, guttate psoriasis, erythrodermic psoriasis and pustular psoriasis respectively. Sixteen patients had elevated FBS, out of which 12(75%) had psoriasis vulgaris, 2(12.5%) had guttate psoriasis, 1(6.25%) had erythrodermic and 1(6.25%) had palmoplantar type of psoriasis.

The mean total cholesterol, low density lipoprotein, serum triglycerides, very low density lipoprotein levels were higher among psoriatic cases as compared to controls. The mean high density lipoprotein levels were lower in psoriasis patient as compared to controls.

The mean total cholesterol in cases and controls were 182.97$\pm$27.53 and 175.3$\pm$24.49 respectively with a P value of 0.110. The mean high density lipoprotein level in cases and controls were 37.48$\pm$7.98 and 42.37$\pm$7.31 respectively (P=0.001). The mean levels of low density lipoprotein were 117.57$\pm$26.10 and 106.57$\pm$23.74 in cases and controls respectively (P=0.017). The mean serum triglyceride levels were 138.48$\pm$32.06 and 131.4$\pm$27.90 in cases and controls respectively (P=0.199). The mean levels of very low density lipoproteins in cases and controls were 27.69$\pm$6.47 and 25.72$\pm$6.28 respectively with a P value of 0.093. Statistically significant difference was seen only in respect to high density lipoproteins and low density lipoproteins

[P= 0.001 and 0.017 respectively], where as the other components of lipid profile showed no significant difference.

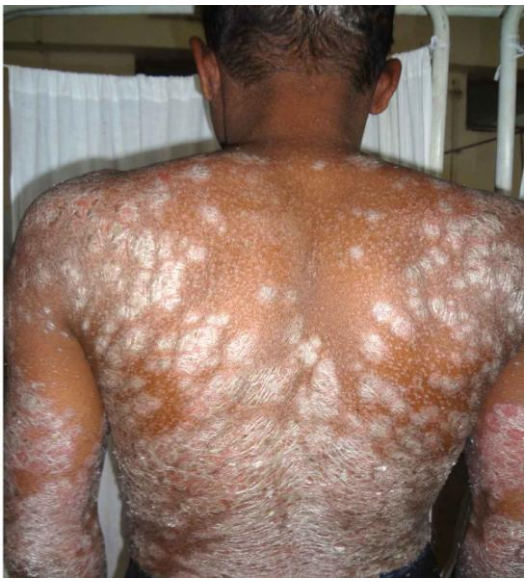

Figure 1: Psoriasis Patient

DISCUSSION

The combination of obesity, impaired glucose regulation, hypertriglyceridemia, reduced high-density lipoprotein, and hypertension is known as the metabolic syndrome. Patients with metabolic syndrome are at a significantly increased risk of developing cardiovascular morbidity and mortality. [10] The importance of metabolic syndrome is that it may confer a cardiovascular risk higher than the individual components.

Recent studies have shown that the prevalence of metabolic syndrome in psoriasis is significantly elevated. [6,7] Similarities exist among psoriasis, the metabolic syndrome and atherosclerosis, with all three conditions characterized by an inflammatory process driven by Th1 cytokines. [8,9] Pro-inflammatory cytokines, such as tumor necrosis factor-alpha (TNF-alpha), interleukin-1 (IL-1) and IL-6, that are overproduced in patients with psoriasis are likely to contribute to the increased risk for development of metabolic syndrome. [11] Chronic systemic inflammation induces endothelial dysfunction, altered glucose metabolism and insulin resistance that play a significant role in the development of these diseases. [12,13]

Inflammation and hypercoagulability predispose to atherothrombosis and seem to be important features of the metabolic syndrome. The most convincing evidence is the association with increased levels of C-reactive protein and adipose tissue-generated inflammatory cytokines. [14] It has been proposed that a state of low-grade inflammation, such as that found in psoriasis, leads to the production of adipocytokines, particularly from truncal fat, which cause insulin resistance and endothelial dysfunction. [15] Increased adipose tissue mass contributes to augmented secretion of pro-inflammatory adipokines, particularly TNF-α, along with diminished secretion of the protective adiponectin. TNF-α and adiponectin are antagonistic in stimulating nuclear transcription factor-kappa B (NF-Ќβ) activation. Through this activation, TNF- α induces oxidative stress, which exacerbates pathological processes leading to oxidized low-density lipoprotein and dyslipidemia, glucose intolerance, insulin resistance, hypertension, endothelial dysfunction and atherosclerosis. NF-Ќβ activation further stimulates the formation of additional inflammatory cytokines, along with adhesion molecules that promote endothelial dysfunction. [16]

We found a higher prevalence of metabolic syndrome in patients with psoriasis than in control subjects. Metabolic syndrome was observed in 26.66% of psoriasis patients, where as only 8.33% of controls had metabolic syndrome, which showed a significant association (P= 0.016). These findings simulated many of the published literature. Gisondi P et al [6] found metabolic syndrome in 30.1% of patients as against 20.6% in controls. A study by Nisa M et al [7] observed metabolic syndrome in 28% and 6% of cases and controls respectively. Similarly many other studies showed higher prevalence of metabolic syndrome in psoriasis patients. [17-19]

In our study there was a significantly high elevated fasting blood sugar levels in 26.66% 0f cases and 10% in controls(P=0.034). Nasi M et al [7] observed high elevated fasting blood sugar in 18% and 5.33% (P=0.0006) where as Madanagobalane S et al [18] observed in 61% and 47.5%(P=0.005) of cases than in controls respectively.

The other components of metabolic syndrome like abdominal obesity, hypertriglyceridemia, low HDL levels and hypertension in our study showed no significant difference between cases and controls(P=0.0221, 0.536, 0.099 and 0.179 respectively). Various studies on components of metabolic syndrome have found varied results as compared to our study. [3] Abdominal obesity and hypertriglyceridemia was observed in significantly higher number of patients in studies by Madanagobalane S et al [18] (P=0.035 and 0.011) and Gisondi P et al [6] (P=0.01 and 0.001) which was in contrast to our results. The occurrence of hypertension and low HDL levels did not show any significant difference among the psoriasis patients and controls in the studies by Madanagobalane S et al [18] (P=0.162 and 0.302) and Gisondi P et al [6] (P=0.7 and 0.2) which was similar to our results.

Another important observation in our study was that there was no significant variation in the occurrence of metabolic syndrome according to the severity of psoriasis assessed on the basis of PASI score (P=0.718). No trend was observed through mild, moderate and severe cases of psoriasis. Madanagobalane S et al [18] and Gisondi P et al [6] found that psoriasis is associated with metabolic syndrome independent of its severity (P=0.499 and 0.9 respectively) which was similar to our study.

Out of the 16 patients who had metabolic syndrome, 87.5% had psoriasis vulgaris and 12.5% patients had guttate type of psoriasis. None of the patients with erythoidermic psoriasis, pustular psoriasis and palmoplantar psoriasis were found to have metabolic syndrome

The mean total cholesterol in cases and controls were 182.97 ±27.53 and 175.3 ±24.49 respectively with a P value of 0.110. The mean high density lipoprotein level in cases and controls was 37.48 ±7.98 and 42.37 ±7.31 respectively (P=0.001). The mean levels of low density lipoprotein were 117.57 ±26.10 and 106.57 ±23.74 in cases and controls respectively (P=0.017). The mean serum triglyceride levels were 138.48 ±32.06 and 131.4 ±27.90 in cases and controls respectively (P=0.199). The mean levels of very low density lipoproteins in cases and controls were 27.69 ±6.47 and 25.72 ±6.28 respectively with a P value of 0.093. The mean high density lipoprotein was lower in psoriasis patients and the mean low density lipoprotein was higher as compared to controls with a statistically significant difference. (P=0.001 and 0.017 respectively).

In a study conducted on the serum lipid abnormalities in psoriasis patients, [20] the range of serum cholesterol level was 228.8 ± 50.9 in case and 202.8 ± 37.5 in the control group(*P*=0.001). The range of serum low density lipoprotein were 145.4 ± 39.7 in cases and 127.7 ± 31.6 in the control group (*P* =0.003). The range of serum triglyceride level was 183.0 ± 87.5 in cases and 144.3 ± 89.9 in the control group (*P* =0.001). The range of serum High Density Lipoprotein value was 43.8 ± 7.9 in cases and 43.9 ± 6.3 in the control group (*P* =0.52). The study found higher levels of total cholesterol, triglycerides, high and low density lipoproteins in cases and controls, as compared to our study. This difference could be because of the geographical variation and the age group included in their study.

CONCLUSION

Psoriasis is one of the most common dermatological conditions seen in the daily practice. There has been a lot of recent research on its consideration as a systemic disease with the researchers being of the

view that the dermatological manifestations represent only a part of spectrum. Recent review of literature suggests that psoriasis is associated with metabolic syndrome. Strong associations with dyslipidemia, obesity, diabetes, increased cardiovascular morbidities apart from common comorbidities like psoriatic arthritis and depressive disorder have been reported.

We have found a higher prevalence of metabolic syndrome in patients with psoriasis, which could play a relevant role in accelerating atherosclerosis. The association is not limited to severe cases but also occurs with mild cases. Therefore, the study emphasizes the fact that for the better management and to prevent the future risk of cardiovascular complications, all patients must be screened for cardiovascular risk factors at the disease onset, irrespective of the severity of psoriasis. All patients with psoriasis should be encouraged to correct aggressively their modifiable cardiovascular risk factors.

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