METABOLIC SYNDROME IN PSORIASIS PATIENTS: A COMPARATIVE STUDY

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ABSTRACT: The patients with Psoriasis are at increased risk of developing Metabolic Syndrome (MS). Proinflammatory cytokines such as tumor necrosis factor- α , interleukin-6 that are increased in the psoriatic plaques are known to contribute to features of MS such as hypertension, dyslipidemia and insulin resistance.

AIMS: (1) To know the prevalence of MS in patients with psoriasis. (2) To compare the results with control population.

MATERIALS AND METHODS: A hospital based comparative study was conducted involving 60 adult patients with psoriasis and 60 age and sex matched controls. All participants were evaluated for components of MS.

RESULTS: Both groups included 33 males and 27 females. MS was present in 15 out of 60(25%) patients with psoriasis and 12 out of 60(20%) controls. Conclusion: Our results suggest that there is a slightly higher prevalence of Metabolic Syndrome in patients with Psoriasis compared to the control population.

KEYWORDS: Comparative Study, Metabolic Syndrome, Psoriasis.

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INTRODUCTION: Psoriasis is a chronic, T-cell mediated inflammatory disease of the skin and occasionally the joints. Several observational studies have recently demonstrated that psoriasis is associated with systemic disorders such as cardiovascular disease, the metabolic syndrome (MS), cancer, chronic obstructive pulmonary disease, inflammatory bowel disease, depression and osteoporosis.^{1,2} The suggested causal link between psoriasis and associated diseases is the presence of systemic inflammation and elevated levels of cytokines such as tumor necrosis factor- α (TNF- α) and interleukin-6 (IL-6).³

There have been recent recommendations to "upgrade" Psoriasis from a cutaneous to a systemic disease, but the topic remains contentious.^[2] A term "Psoriasis march" is described where the state of chronic inflammation in the patient affected by psoriasis leads to insulin resistance, which leads to endothelial dysfunction and atherosclerosis, and consequently to myocardial infarction and stroke.⁴

MS, defined as a cluster of risk factors including central obesity, atherogenic dyslipidemia, hypertension and glucose intolerance, is a strong predictor of cardiovascular disease,

that confers a cardiovascular risk higher than the individual components.^{5,6} Increased mortality from cardiovascular disease in patients with severe psoriasis has been documented and psoriasis may be an independent risk factor for myocardial infarction, especially in young patients.⁶ Psoriasis is associated with MS, independent of its severity.⁶

Several factors may contribute to an unfavorable cardiovascular risk profile in patients with psoriasis, such as cigarette smoking, alcohol consumption, obesity, physical inactivity, homocysteinemia, psychological stress, and depression, all of which are more prevalent in patients with psoriasis.^[7,2]

In addition, many traditional systemic therapies for psoriasis may also worsen cardiovascular risk factors such as hyperlipidemia, hypertension and homocysteinemia.^[7,2] Psoriasis affects about 3% of the population world-wide.^[7] Recent studies have estimated prevalence of MS to be 15-24% in the general population and 30-50% among psoriasis patients. This increased frequency imposes a substantial burden on the overall health of psoriasis patients, which needs to be appropriately addressed during treatment of such patients.

AIMS:

1. To know the prevalence of MS in patients with psoriasis.
2. To compare the results with control population.

MATERIALS AND METHODS: This was a hospital based comparative study. During the study period from August 2014 to September 2015, 60 psoriasis patients attending the Dermatology Department are enrolled after obtaining informed consent and 60 age and sex matched healthy controls were enrolled after obtaining informed consent.

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Cases: A total of 60 patients with psoriasis satisfying the following inclusion and exclusion criteria were enrolled:

Inclusion criteria: Patients with psoriasis, 18-45 years of age and those with psoriasis of at least 6 months duration.

Exclusion criteria: Patients with psoriasis <18 years of age and >45 years, those with psoriasis of <6 months duration and those on systemic treatment for psoriasis, those diagnosed with diabetes mellitus, hypertension and dyslipidemia.

Controls: 60 age and sex matched controls satisfying the inclusion and exclusion criteria were enrolled.

- Inclusion criteria: Healthy individuals of 18-45 years age.
- Exclusion criteria: Diagnosed cases of diabetes mellitus, hypertension and dyslipidemia.

After obtaining informed consent from the patients, relevant data such as age, sex, occupation, age at the onset of psoriasis, psoriasis area severity index (PASI), presence of psoriatic arthropathy and psoriatic erythroderma were collected in a proforma. PASI was calculated as given below.^[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 ≤ 10 % area; 2=10-29%; 3=30-49%; 4=50-69%; 5=70-89%; and 6=more than 90%. The final formula for PASI score: $PASI = 0.1 (Eh + Ih + Dh) Ah + 0.2 (Eu + lu + Du) Au + 0.3 (Et + It + Dt) At + 0.4 (El + Il + Dl) Al$.

For MS, following parameters were assessed: waist circumference, triglyceride level, high density lipoprotein (HDL) cholesterol level, blood pressure and fasting glucose. To determine the waist circumference, measuring tape was placed around the abdomen at the level of uppermost part of the pelvic bone, while ensuring that the tape measure remained horizontal and was snug without causing compression on the skin. Venous blood samples were collected from the patients after they fasted overnight (at least 8h).

Triglycerides and serum cholesterol were measured using standard enzymatic procedure. Blood pressure was recorded in a sitting posture and was calculated as an average of two measurements after the patients took the rest for 5 min. MS was diagnosed if three or more criteria of the National Cholesterol Education Program's Adult Treatment Panel III (ATP-III) were present, as given below:^[8] NCEP: ATP III 2001.

Three or more of the following:

1. Central obesity: Waist circumference >102 cm (M), >88 cm (F).
2. Hypertriglyceridemia: Triglycerides ≥150mg/dL or specific medication.
3. Low HDL cholesterol: <40mg/dL (M) and <50mg/dL (F), respectively, or specific medication.
4. Hypertension: Blood pressure ≥130 mm systolic or ≥85 mm diastolic or specific medication.

5. Fasting plasma glucose: ≥100mg/dL or specific medication or previously diagnosed Type 2 diabetes.
- Ethics committee clearance was obtained prior to the study.

RESULTS: Age of the 60 cases and controls, 33 each were male and 27 female. The mean age of cases was 34.75. The mean age of the controls was 34.75. Psoriasis cases with MS had a mean age of 39.66 while controls with MS had a mean age of 41.25.

Type of psoriasis of the 60 cases, 51 had psoriasis vulgaris, 2 had guttate psoriasis, 1 had psoriatic erythroderma, 1 had acute generalized pustular psoriasis and 5 patients had palmoplantar psoriasis.

PASI: The mean PASI among cases was 8.63. The mean PASI among psoriasis patients with MS was 9.14 and in those without MS was 8.46.

Body Mass Index (BMI): The mean BMI among case was 23.19 and in controls was 22.61. The mean BMI among cases with MS was 39.66 and among controls with MS was 45.

Abdominal Obesity: 16.66% of cases had abdominal obesity and 11.66% of controls had abdominal obesity. 33.33% of cases with MS had abdominal obesity and 33.33% of controls with MS had abdominal obesity.

Fasting blood sugar, S. Triglycerides and S. HDL: The mean FBS among cases was 93.08mg/dl and among cases with MS was 95.1mg/dl. The mean FBS among cases with MS was 126.4mg/dl and among controls with MS was 143.33mg/dl.

The mean S. triglycerides among cases was 130.9mg/dl and among controls was 136.7mg/dl. The mean S. Triglycerides among cases with MS was 186.8mg/dl and among controls with MS was 181mg/dl. The mean S. HDL among cases was 34.75mg/dl and among controls was 46.31mg/dl. The mean S.HDL among cases with MS was 29.66mg/dl and among controls with MS was 32.74mg/dl.

Systolic and Diastolic Blood Pressure: The mean Systolic Blood Pressure among cases was 120.93 mm of hg and among controls was 121.83 mm of hg. The mean Systolic Blood Pressure among cases with MS was 129.33 mm of hg and among controls with MS was 131.66 mm of hg.

The mean Diastolic Blood Pressure among cases was 81 mm of hg and among controls was 79.83 mm of hg. The mean Diastolic Blood Pressure among cases with MS was 88.66 mm of hg and among controls with MS was 88.33 mm of hg.

MS in cases and controls 25% of cases had MS and 20 % of controls had MS. Out of 60 cases 15 had MS, 9(15%) were male and 6(10 %) were female while 12 out of 60 controls had MS, 7(11.66 %) were male and 5(8.33%) were female.

DISCUSSION: Our study observed a higher prevalence of MS in cases (25%) compared to controls (20%) as per NCEP ATP III criteria. Mebazaa et al.,⁹ studied 164 psoriasis patients and 216 controls and showed a higher prevalence of MS in psoriatic patients (35.5%) compared to controls (30.8%). Cases and control groups with MS in our study had higher mean age compared to those without MS in their respective groups. Sumner et al.,¹⁰ also concluded that the prevalence of MS increased with age, prevalence being 6.6% in young adults and 34% in older adults. MS was independent of PASI in our study. Similar results were observed in studies performed by Gisondi et al.^[6] and Nisa and Qazi.¹¹

We found that mean BMI, Waist circumference, Systolic blood pressure, Diastolic blood pressure, fasting blood sugar level, S. Total cholesterol, S. Triglycerides, S. LDL, S. VLDL were higher in psoriasis patients with MS compared to those without MS while mean S. HDL was low in cases with MS compared to cases without MS. Dreihier et al.,¹² found a significant increase in lipid levels among cases than in controls ($P<0.001$). Shapiro et al.,¹³ found that psoriasis was associated hyperlipidemia, but was not associated with an increase in LDL level. Cohen et al.,¹⁴ have found that psoriasis is associated with dyslipidemia ($P<0.015$).

CONCLUSION: Our study showed a higher prevalence of Metabolic Syndrome among patients with Psoriasis compared to the control population. The prevalence of MS in cases being 25 % while in controls it was 20%. However, the statistical significance of this difference, the influence of race, type of lifestyle, factors like smoking, drinking and food habits, socio. economic status and occupations involving heavy work on the occurrence of MS in psoriasis needs to be examined in larger studies.

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Sl. No.	Parameters	Cases	Cases with MS(15)	Controls	Controls with MS (12)
1.	Central obesity : Waist circumference >102cm (M), >88 cm (F)	16.66% (10/60)	10% (6/60)	11.66% (7/60)	6.66% (4/60)
2.	Hypertriglyceridemia : Triglycerides $\geq$ 150mg/dL or specific medication	31.66% (19/60)	23.33% (14/60)	20% (12/60)	20% (12/60)
3.	Low HDL cholesterol :< 40mg/dL (M) and < 50mg/dL (F), respectively, or specific medication	80% (48/60)	23.33% (14/60)	26.66% (16/60)	20% (12/60)
4.	Hypertension : Blood pressure $\geq$ 130 mm systolic or $\geq$ 85mm diastolic or specific medication	45% (27/60)	21.66% (13/60)	38.33% (23/60)	18.33% (11/60)
5.	Fasting plasma glucose $\geq$ 100 mg/dL or specific medication or previously diagnosed Type 2 diabetes	8.33% (5/60)	6.66% (4/60)	16.66% (10/60)	16.66% (10/60)

Table 1: Comparison of Percentage of cases and controls satisfying individual parameters of NCEP ATP III criteria for Metabolic Syndrome

Sl. No.		cases	controls
1.	Number	60	60
2.	Gender	Males:33,Females:27	Males:33,Females:27
3.	Age	34.75	34.75
4.	BMI	23.19	22.61
5.	Waist circumference	83.75	86
6.	Systolic BP (mmHg)	120.93	121.83
7.	Diastolic BP (mmHg)	81	79.83
8.	Triglyceride (mg/dL)	130.9	136.7
9.	Total cholesterol (mg/dL)	154.06	130.23
10.	HDL (mg/dL)	34.75	46.31
11.	LDL (mg/dL)	95.99	90.23
12.	VLDL (mg/dL)	26.25	32.98
13.	FBS (mg/dL)	93.08	95.1

Table 2: Average Age, BMI, Waist Circumference, BP, Fasting lipid profile and FBS among cases and controls

Sl. No.		With MS	Without MS
1.	Number of patients	15	45
2.	Age (years)	39.66	33.11
3.	Gender	Males:9,Females:6	Males:24,Females:21
4.	PASI score	9.14	8.46
5.	BMI (kg/m2)	25.476	22.43
6.	Waist circumference (cm)	87.4	82.5
7.	Systolic BP (mm Hg)	129.33	115.73
8.	Diastolic BP (mm Hg)	88.66	78.44
9.	Triglyceride (mg/dL)	186.8	112.26
10.	Total cholesterol (mg/dL)	162.26	151.33
11.	HDL (mg/dL)	29.66	36.44
12.	LDL (mg/dL)	103.66	93.44
13.	VLDL (mg/dL)	32.6	24.13
14.	FBS (mg/dL)	126.4	81.977

Table 3: Comparative Characteristics of Psoriasis Cases with and without Metabolic Syndrome

Sl. No.		Cases	Controls
1.	Number of individuals	15	12
2.	Age (years)	39.66	41.25
3.	Gender	Males:9,Females:6	Males:7,Females:5
4.	BMI (kg/m2)	25.476	24.56
5.	Waist circumference (cm)	87.4	88.99
6.	Systolic BP (mm Hg)	129.33	131.66
7.	Diastolic BP (mm Hg)	88.66	88.33
8.	Triglyceride (mg/dL)	186.8	181
9.	Total cholesterol (mg/dL)	162.26	148.54
10.	HDL (mg/dL)	29.66	32.74
11.	LDL (mg/dL)	103.66	89.166
12.	VLDL (mg/dL)	32.6	28.83
13.	FBS (mg/dL)	126.4	143.33

Table 4: Comparison of Cases and controls Having Metabolic Syndrome