

A study on metabolic syndrome in patients with Psoriasis

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Abstract

Objectives

- To study the association of psoriasis and metabolic syndrome.
- To evaluate the disease activity and duration in psoriatic patients with and without metabolic syndrome.

Materials and Method: The study was conducted at MVJ Medical College, Hoskote, Bangalore. 100 newly diagnosed psoriasis patients who had not received systemic treatment 1 month before enrollment were included in study. A complete lipid profile with fasting blood glucose levels were estimated together with measurement of blood pressure and central obesity. Serum lipids were measured and fasting glucose was analysed.

Results: Among the 100 patients studied, a majority of patients were male (56%), while female patients accounted for 44%. 37 out of 100 patients had metabolic syndrome. Impaired HDL levels and fasting triglyceride were the most commonly affected components of metabolic syndrome affecting 59% and 54% respectively. There was a direct relationship between the occurrence of metabolic syndrome and extent of body surface area involved by psoriasis. Patients with psoriasis for more than 73 months had a higher occurrence of metabolic syndrome (37.84%). There was no significant correlation between PASI score and metabolic syndrome.

Interpretation and Conclusion: Our study correlated with the various Indian and western studies proving an association between psoriasis and metabolic syndrome. This has important implication in aiding the dermatologist to tackle issue of metabolic syndrome in psoriatic patients and in the process prevent the cardiovascular complication that are anticipated.

Keywords: Psoriasis; Metabolic syndrome; Lipid profile; Central obesity; Body surface area.

Introduction

Psoriasis is a chronic inflammatory skin disorder affecting 1-3% of the population. Genetic factors play a critical role in the pathogenesis of psoriasis. The lesions of psoriasis consist of red scaly, sharply demarcated, indurated plaques present particularly over extensor surfaces and scalp.

It is characterized by epidermal, hyperproliferation, abnormal keratinocyte differentiation, angiogenesis with blood vessel dilatation, and Th 1 and Th 17 inflammation.⁽¹⁾ Psoriasis may act as an external indicator of underlying immune and metabolic dysregulation.⁽²⁾

The metabolic syndrome is a constellation of lipid and non-lipid cardiovascular risk factors of metabolic origin.⁽¹⁾ It is a cluster of risk factors including central obesity, atherogenic dyslipidaemia, hypertension and glucose intolerance, and is a strong predictor of cardiovascular diseases, diabetes and stroke.⁽³⁾ Increasingly, associations between psoriasis and metabolic diseases such as obesity, diabetes, and cardiovascular disease have been recognized.⁽¹⁾

A direct correlation between severity of psoriasis and the prevalence of obesity, dyslipidaemia and hyperhomocysteinaemia has been reported in psoriatic patients, suggesting that skin changes (inflammation) caused by psoriasis have a direct role in determining

these risk factors. Also Psoriasis has been found to be associated with relevant cardiovascular risk factors.⁽³⁾

In contrast to normal skin, IL-17 is expressed in psoriatic skin lesions, and is known to induce the key psoriatic cytokines of TNF α , and IL-1, IL-6, and IL-8, among a cascade of inflammatory mediators. IL-17 is also seen at higher levels, along with IL6, IL-8, and C-reactive protein, in the plasma of patients who have suffered unstable angina and acute MI.⁽²⁾

Materials and Method

The study was conducted in patients who attended the outpatient department of Dermatology, Venereology and Leprology, MVJ Medical College and Research Hospital, Hoskote, Bangalore. The study was conducted over 21 months.

Inclusion Criteria:

- Patients with psoriasis attending OPD of dermatology, MVJMC & RH between October 2014 and March 2016.
- Minimum of 100 patients
- Aged > 18 years of age.

Exclusion Criteria:

- Patients receiving any systemic therapy like methotrexate, acitretin 1 month before enrollment.

All patients attending outpatient department of DVL, MVJ Medical College and Research Hospital, Bangalore were screened for the presence of psoriasis

identified clinically. General data regarding age, sex, symptoms, treatment history, family history, history of cardiovascular and cerebrovascular diseases were collected. Waist circumference and BP was recorded.

Severity of psoriasis was assessed according to Psoriasis Area and Severity Index [PASI] and Body Surface Area [BSA].

HISTOPATHOLOGY was done whenever the diagnosis was doubtful.

Serum HDL cholesterol and triglycerides were measured with enzymatic procedures. Plasma glucose was measured using glucose oxidase method.

Ethical consideration was taken from institutional ethical committee.

All results will be recorded, tabulated and analyzed according to statistical proportions using Pearson chi-square test.

Results

One hundred patients of psoriasis who presented to the department of dermatology of MVJ Medical College and Research Hospital between October 2015 and March 2017 were studied.

Age Distribution of Psoriatic Patients.

The age of the patients ranged from 18 years to 70 years. The majority of patients were in the 31 to 40 years age group.

Sex distribution: Out of the 100 patients 56 patients were males and 44 patients were female.

Type of psoriasis: All forms of psoriasis could be seen including Chronic plaque type, palmoplantar type, scalp psoriasis and erythrodermic. Chronic plaque type was the most commonly seen being present in 58 out of the 100 cases (58%) which was followed by palmoplantar and scalp psoriasis accounting for 20% of the cases each.

Individual components of metabolic syndrome

Waist Circumference: A cut off value of 102 cm was taken for males and 88 cm was taken for females (According to NCEP ATP III definition).

Abnormal waist circumference was seen in 32 out of the total 100 patients. 19 of these patients were females constituting 59.4% of the patients with central obesity and remaining 13 patients were male (40.62%).

Hypertension (Blood pressure >130/85 mm Hg): A cut off value of > 130 mm systolic or > 85 diastolic was taken. (According to NCEP ATP III definition).

Hypertension was observed in 37 patients. 21 (56.75%) of these patients were males and remaining 16 (43.24%) patients were females.

Fasting Glucose Levels (≥ 100 mg/dl): A cut off value of >100 mg/dl was taken. (According to NCEP ATP III definition).

Impaired levels were seen in 35 out of the total 100 patients. 21 of these patients were females constituting 60% and remaining 14 patients were males (40%).

Hypertriglyceride Levels: Levels > 150 mg/dL.

A cut off value of >150 mg/dl was taken. (According to NCEP ATP III definition).

Impaired levels were seen in 54 out of the total 100 patients. 35 of these patients were males constituting 64.8% of the patients and remaining 19 patients were females (35.18%).

Low HDL Levels (Males <40 mg/dl, <50 mg/dl): A cut off value of < 40 mg/dl was taken for males and < 50 mg/dl was taken for females (According to NCEP ATP III definition).

Impaired levels were seen in 59 out of the total 100 patients. 31 of these patients were females constituting 52.54% of the patients and remaining 28 patients were males (47.45%).

Components of metabolic syndrome: Central obesity was seen in 67.5% of the patients with metabolic syndrome whereas it was seen only in 11% in patients without metabolic syndrome. Hypertension was seen in 75.6% of patients with metabolic syndrome as opposed to 7.9% of patients without metabolic syndrome. Impaired fasting glucose was seen in 64.86% of the patients with metabolic syndrome and in 17.4% of patients without metabolic syndrome. Hypertriglyceridemia was seen in 91.89% of the patients with metabolic syndrome and in 31.7% of patients without metabolic syndrome. High HDL levels was seen in 73% of the patients with metabolic syndrome and in 50.8% of patients without metabolic syndrome.

Psoriasis and metabolic syndrome: According to the above tabulations by applying the NCEP ATP III criteria, metabolic syndrome was present in 37 out of the 100 psoriatic patients (37%).

Type of Psoriasis affected by metabolic syndrome: As already mentioned 37% of the psoriasis patients were affected by metabolic syndrome. The commonly affected type of psoriasis was chronic plaque type, which constituted 25 of the 37 cases (67.6%). This was followed by palmoplantar type, which constituted 8 out of the 37 cases (21.62%).

Extent of BSA involvement in cases: Involved Body surface area (BSA) was calculated in all the patients to correlate the presence of metabolic syndrome with the extent of body surface area affected by psoriasis. The patients were broadly divided into 2 groups which were <10% BSA and >10% BSA. Out of the total 37 patients with metabolic syndrome, psoriasis involved >10% of BSA in 33 cases (89.2%), whereas < 10% of BSA was affected in 4 cases (10.8%).

Based on Pearson Chi-Square Test P value was 0.035.

Hence significantly higher proportion of psoriasis patients with BSA > 10 % had metabolic syndrome.

Correlation of duration of the disease and metabolic syndrome: The duration of the disease was studied to evaluate the correlation of metabolic syndrome with the duration of the disease. Of the 37 patients with metabolic syndrome 37.84% of the patients had a

duration of > 73 months. According to the tabulated results the occurrence of metabolic syndrome showed an increasing trend with the duration of the disease.

Correlation of metabolic syndrome and PASI Score:

PASI (Psoriasis Area severity index) was calculated in the cases studied. This was done to correlate the occurrence of metabolic syndrome and a high PASI score. The patients were broadly divided into 2 groups which were <15 PASI and >15 PASI. Out of the total 37 patients with metabolic syndrome, <15 PASI was present in 28 cases (75.7%), whereas > 15 PASI was present in 9 cases (24.32%).

Based on Pearson Chi-Square Test P value was 0.506

Hence there was no significant difference in proportion of patients with PASI < 15 and PASI > 15 among psoriasis patients with metabolic syndrome.

Discussion

Psoriasis is associated with the cardiometabolic risk factors of metabolic syndrome. According to the NCEP ATP III definition, metabolic syndrome is present if three or more of the following five criteria are met: waist circumference over 40 inches (men) or 35 inches (women), blood pressure over 130/85 mmHg, fasting triglyceride (TG) level over 150 mg/dl, fasting high-density lipoprotein (HDL) cholesterol level less than 40 mg/dl (men) or 50 mg/dl (women) and fasting blood sugar over 100 mg/dl. This study was undertaken to study one such debatable association – association with abnormalities in the lipid profile, blood glucose levels and prevalence of hypertension, which collectively constitute the so-called metabolic syndrome.⁽⁴⁾

Age distribution: Comorbidities tend to increase with age.⁽⁵⁾ 7.3% of psoriasis patients aged over 65 years have at least three comorbidities and 57.8% have two or more comorbidities.⁽⁷⁾ It has been observed that, while the frequency of skin conditions such as acne, urticaria and atopic dermatitis are reduced in patients with psoriasis compared with expected frequencies in the general population, the frequency of some noncutaneous, although related, conditions is significantly increased.⁽⁸⁾

Common type of Psoriasis: In the present study, the most common type of psoriasis seen was chronic plaque psoriasis (58 %). This is in consistent with the literature, which says that chronic plaque psoriasis is seen in 90% of patients.⁽¹¹⁾

Components of metabolic syndrome: NCEP ATP III criteria were employed to diagnose metabolic syndrome. We that found that 37% of the patients were affected by metabolic syndrome, out of which 59.45% were males. The modified NCEP ATP III criteria suggested the cut-off points of waist circumference should be ethnic specific where individuals of Asian origin should use the cut-off of 90 cm in men and 80 cm in women.⁽¹²⁾ Using this we found that 44% of the

patients were affected by metabolic syndrome co-relating with the previous studies.

Central obesity: Using NCEP ATP III criteria central obesity was seen in 32% of the patients out of which 59.38% of patients were females. The modified NCEP ATP III criteria were also used. For NCEP criteria, abdominal obesity is a component of the syndrome but not a prerequisite for its diagnosis.⁽¹²⁾ This is similar to studies conducted by Gisondi et al., (57.1% vs 47.6%),⁽³⁾ Thorvardur et al (62.9% vs 49.9%)⁽¹³⁾ and Jacob Drehier and Dahlia (24% vs 17.9%).⁽¹⁴⁾

Fasting blood sugars: Impaired fasting glucose is considered a pre-diabetic state, associated with insulin resistance and increased risk of cardiovascular pathology, although of lesser risk than impaired glucose tolerance (IGT). IFG sometimes progresses to type 2 diabetes mellitus. A recent study by Nicolas et al cited the average time for progression as less than three years.⁽¹⁵⁾ IFG is also a risk factor for mortality. Neimann et al,⁽¹¹⁾ Sommer et al.⁽¹⁶⁾ Shapiro et al⁽¹⁷⁾ and Cohen et al⁽¹⁸⁾ have all reported an increase in the prevalence of diabetes in patients with psoriasis.

Hypertension: Cohen et al⁽¹⁸⁾ who reported that the prevalence of hypertension was significantly higher in psoriasis patients than controls (38.8%, 29.1% respectively). Jacob Drehier and Dahl reported that hypertension was present in 37.5% of the cases versus 29% of the controls.⁽¹⁴⁾ Similar results were reported by Cohen et al., (27.5% vs 14.4%)⁽¹⁸⁾ and Sommer et al noted similar results.⁽¹⁶⁾

Hypertriglyceridemia: Serum lipids levels were analyzed in cases. Impaired triglyceride levels were seen in 54 out of the total 100 patients. 35 of these patients were males constituting 64.8% and remaining 19 patients were females constituting 35.18%.

This is similar to study of Laurie Barclay et al⁽¹⁹⁾ (44% in cases), Gisondi et al⁽³⁾ (37.8% vs 23.3% of controls) and Jacob Drehier and Dahlia⁽¹⁴⁾ (57.1% vs 47.4% of controls).

Hypercholesterolemia: Mallbris⁽²⁰⁾ et al in a study on 200 psoriasis cases showed elevated total serum cholesterol but the change was not significant. Rocha-Pereira²¹ reported increased cholesterol values in 38 psoriasis patients, whereas Piskin⁽²²⁾ et al showed significantly raised levels in 100 patients.

Metabolic syndrome: In our study 37 out of the 100 psoriatic patients had metabolic syndrome which correlated with the previous studies.

Isabela Guimarães Ribeiro Baeta et al reported that 80 patients (44.9%) met the criteria for the diagnosis of MS according to the NCEP-ATP III (42.6% of men and 47.2% of women).⁽²³⁾ In another study conducted by Niti Khunger et al a diagnosis of metabolic syndrome was made in 30% of cases and 8% of controls, which was statistically significant (P < 0.005).⁽²⁴⁾ Sristi Lakshmi et al., reported that the presence of MS among patients with psoriasis was 13 out of 40 (32.5%) and that in the control group was 12 out of 40 (30%).⁽²⁵⁾

Catherine Ni and Melvin W Chiu also reported that the prevalence of metabolic syndrome ranged from 14% to 40%.⁽²⁶⁾ Gisondi et al., reported that metabolic syndrome was significantly more common in psoriatic patients than in controls (30.1% vs. 20.6%). Sinéad M. Langan et al., reported that metabolic syndrome was identified in 34% of participants with psoriasis compared with 26% of controls.⁽²⁷⁾ A historical cohort study in Sweden comparing cardiovascular mortality in patients hospitalized for psoriasis vs. outpatient controls found that inpatient psoriatics had a 50% greater risk of cardiovascular death.⁽²⁸⁾

Extent of body surface area involved: Out of the total 37 patients with metabolic syndrome in our study, psoriasis involved >10% of BSA in 33 cases (89.2%), whereas < 10% of BSA was affected in 4 cases (10.8%). Sristi Lakshmi et al., reported that the mean percentage body surface area (BSA) of involvement of cases having psoriasis was 38.50%. The mean BSA among patients with MS was 26.54% and in those without MS was 44.19%.⁽²⁵⁾ Joel M. Gelfand and Howa Yeung found a direct relation between body surface area and metabolic syndrome.⁽²⁹⁾ Although Nisa and Qazi⁽³⁰⁾ found no difference in the prevalence of MS based on PASI score and BSA involvement.

Duration of disease: In our study of the 37 patients with metabolic syndrome 37.84% of the patients had a duration of > 73 months. The occurrence of metabolic syndrome showed an increasing trend with the duration of the disease. Sommer et al⁽¹⁶⁾ reported that metabolic syndrome is related to the duration of the disease, psoriasis starts in young ages in patients with metabolic syndrome and duration of the disease is longer in patients with metabolic syndrome. Gisondi et al., reported that psoriatic patients with metabolic syndrome were older and had a longer disease duration compared with psoriatic patients without metabolic syndrome.⁽³⁾ Although Ilkin Zindancı et al observed that psoriasis started at advanced age in their patients with metabolic syndrome and metabolic syndrome was not related to the duration of the disease.⁽³¹⁾

PASI score: PASI score was calculated in the cases included in our study. Out of the total 37 patients with metabolic syndrome, <15 PASI was present in 28 cases (75.7%), whereas > 15 PASI was present in 9 cases (24.32%). The results were similar to other studies conducted. Sristi Lakshmi et al⁽²⁵⁾ reported that MS was independent of PASI. Similar results were obtained by Gisondi et al⁽³⁾ and Nisa and Qazi.⁽³⁰⁾ They found no difference in the prevalence of MS based on PASI score. Kim et al., however, found that MS was associated with severe forms of psoriasis (P = 0.048).⁽³²⁾

Table 1: Age and sex distribution

| Age in Years | Males | Females |
|--------------|-------|---------|
| <20 | 3 | 1 |
| 21-30 | 5 | 20 |
| 31-40 | 19 | 8 |
| 41-50 | 15 | 10 |
| 51-60 | 10 | 3 |
| 61-70 | 4 | 2 |
| Total | 56 | 44 |

Table 2: Hypertension (Blood pressure >130/85 mm Hg)

| | Males | Females | Total |
|----------|----------------|----------------|-----------|
| Normal | 35 | 28 | 63 |
| Abnormal | 21 (56.75%) | 16 (43.24%) | 37 (100%) |

Table 3: Fasting Glucose Levels (≥ 100 mg/dl)

| | Males | Females | Total |
|----------|----------|----------|--------------|
| Normal | 42 | 23 | 65 |
| Abnormal | 14 (40%) | 21 (60%) | 35 (100%) |

**Table 4: Hypertriglyceride Levels
Levels > 150 mg/dL**

| | Males | Females | Total |
|----------|---------------|----------------|--------------|
| Normal | 21 | 25 | 46 |
| Abnormal | 35 (64.8%) | 19 (35.18%) | 54 (100%) |

Table 5: Low HDL Levels (Males <40 mg/dl, <50 mg/dl)

| | Males | Females | Total |
|----------|----------------|----------------|--------------|
| Normal | 28 | 13 | 41 |
| Abnormal | 28 (47.45%) | 31 (52.54%) | 59 (100%) |

Table 6: Extent of BSA involvement in cases

| BSA | Metabolic syndrome | | Total |
|-------|--------------------|------------|-------|
| | Present | Absent | |
| <10 | 4 (10.8%) | 32 (50.8%) | 36 |
| >10 | 33 (89.2%) | 31 (49.2%) | 64 |
| Total | 37 | 63 | 100 |



Erythroderma



Chronic Plaque Psoriasis



Scalp Psoriasis

Conclusion

- Out of 100 cases, 56 were males and 44 females. Most of the patients belonged to the age 31-40 years.
- 37% of patients were affected by metabolic syndrome.
- Commonly deranged parameters of metabolic syndrome were fasting levels of serum triglycerides and HDL cholesterol
- Fasting glucose levels followed by central obesity were commonly impaired components in females. Whereas males had hypertriglyceridemia, and hypertension.
- There was a statistically significant correlation between extent of body surface area involvement of psoriasis and the presence of metabolic syndrome.
- There was an increasing trend of occurrence of metabolic disease with longer duration of the disease.

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