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Association of metabolic syndrome with chronic plaque psoriasis patients: a case control study at a tertiary care centre in eastern Bihar

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Abstract

Background - Psoriasis is a group of common, chronic, inflammatory and proliferative conditions of the skin, associated with systemic manifestations in many organ systems. The most characteristic lesions consist of red, scaly, sharply demarcated, indurated plaques, present particularly over the extensor surfaces and scalp. Metabolic Syndrome (MS) consists of a group of metabolic abnormalities that confer an increase of cardiovascular disease (CVD) and diabetes mellitus (DM). It consists of insulin resistance, central obesity, hypertension (HTN) & dyslipidemia. We are conducting this study to document and analyze the association of chronic plaque psoriasis and metabolic syndrome.

Aims and objectives – To evaluate the frequency of metabolic syndrome in patients with chronic plaque psoriasis compared to healthy controls and to determine association of chronic plaque psoriasis and metabolic syndrome with age of patient, severity and duration of psoriasis.

Methods –The present study is an case control study in which all consecutive cases with cardinal features of

chronic plaque psoriasis were recruited after execution of written consent by following the defined inclusion and exclusion criteria as cases. Age and sex matched controls were taken as well according to inclusion criteria. The relevant investigations done to ascertain metabolic syndrome according to SAM-NCEP ATP III criteria.

Results – Total 85 cases and 85 age and sex matched controls were enrolled in the study. Average age of patients were 43.2+/-14.78 years. Male to female ratio was 2.2:1. The maximum number of patients with metabolic syndrome were in the age group of 3rd and 4th decade. Mean disease duration was 5.1 years. Mean PASI score was 8.4. Prevalence of metabolic syndrome in Study group was 55% and in control group it was 38%. Odds ratio came out to be 2.04 with p-value of 0.031 with confidence interval of 95%, which shows result to be statistically significant.

Conclusion – According to the result, there is more chances of finding metabolic syndrome in psoriasis patients than the normal population. There was no significant association between the history of alcohol intake or smoking and frequency of metabolic syndrome. This study indicates the necessity of psoriasis patients for the detection of metabolic syndrome in order to avoid future consequences.

Keywords: Hypertension, Metabolic Syndrome, Psoriasis

Introduction

Psoriasis is a group of common, chronic, inflammatory and proliferative conditions of the skin, associated with systemic manifestations in many organ systems. The most characteristic lesions consist of red, scaly, sharply demarcated, indurated plaques, present particularly over the extensor surfaces and scalp.[1]

Chronic plaque psoriasis, or psoriasis vulgaris, is a chronic inflammatory skin disease characterised by well demarcated, erythematous, scaly plaques on the extensor surfaces of the body and scalp. The lesions may occasionally itch or sting, and may bleed when injured. Dystrophic nail changes or nail pitting are found in more than one third of people with chronic plaque psoriasis, and psoriatic arthropathy occurs in 1% to more than 10%. The condition waxes and wanes, with wide variations in course and severity among individuals. Other varieties of psoriasis include guttate, inverse, pustular, and erythrodermic psoriasis.[2]

The prevalence varies from 0.1% to 3% across geographical regions of the world.[3] In India, it varies from 0.84% to 5.6% in different studies.[4] The exact etiology of psoriasis is not known. Currently, the most accepted hypothesis is that psoriasis is an immune-mediated inflammatory skin disease that manifests in a genetically predisposed person exposed to certain environmental agents or triggers.[5]

Psoriasis tends to worsen during periods of stress, during adverse environmental conditions of cold weather and low humidity, with the administration of certain drugs and during course of certain infections.[6]

Metabolic syndrome is defined by a constellation of interconnected physiological, biochemical, clinical, and metabolic factors that directly increase the risk of cardiovascular disease, type 2 diabetes mellitus, and all cause mortality.[7]

According to National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III), metabolic syndrome is present if three or more of the following five criteria are met:

1. Central obesity: waist circumference >102 cm in males, >88 cm in females.

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2. Hypertriglyceridemia: triglycerides ≥150 mg/dL or specific medication.
3. Low HDL cholesterol: < 40 mg/dL for males and < 50 mg/dL for females, or specific medication
4. Hypertension: blood pressure ≥130 mm systolic or ≥85 mm diastolic or specific medication.
5. Fasting plasma glucose: ≥130 mg/dL or specific medication or previously diagnosed type 2 diabetes.[8]

Chronic inflammation is known to be associated with visceral obesity and insulin resistance which is characterized by production of abnormal adipocytokines such as tumor necrosis factor α, interleukin-1 (IL-1), IL-6, leptin, and adiponectin. The interaction between components of the clinical phenotype of the syndrome with its biological phenotype (insulin resistance, dyslipidemia, etc.) contributes to the development of a proinflammatory state and further a chronic, subclinical vascular inflammation which modulates and results in atherosclerotic processes.[7]

Aims and Objectives

1. To evaluate the frequency of metabolic syndrome in patients with chronic plaque psoriasis compared to healthy controls
2. To determine the association of chronic plaque psoriasis and metabolic syndrome with age of patient, severity and duration of psoriasis.

Materials and Methods

This was an Institution based case control study conducted at the out-patients Department (OPD) of Dermatology, Venereology & Leprosy (D.V.L.) at a tertiary care center in Eastern India, with prior approval from the institutional ethics committee. Patients coming to the hospital on an out-patient basis with cardinal features of chronic plaque psoriasis were enrolled in the study. Age and sex matched controls were also enrolled in the study. Duration of study was one year commencing from 1st september 2022 and concluding on 30th April 2024. A total 85 cases of Chronic plaque psoriasis and 85 controls were enrolled in the study.

Inclusion criteria – Case

1. Clinically confirmed new cases of chronic plaque psoriasis.
2. Patients aged 18 years and above of either gender will be incorporated in the study.

Inclusion criteria – Control

1. Age and sex matched individuals not having any disease which have known association with metabolic syndrome

Exclusion criteria

1. Patients not willing to sign the consent form
2. Patients who are on any systemic drugs for psoriasis

Study Technique

All patients approaching on out-patient basis in D.V.L department and having key features of chronic plaque psoriasis will be included in the study as cases and age and sex matched individual not having any disease which have known association with metabolic syndrome will be included in the study as controls. A prior written consent will be obtained from all patients. A predefined and standard proforma comprising personal details, clinical history, medical treatment history and examination details will be filled for every patient. Relevant investigations will be conducted and data will be obtained.

Result

A total of 85 patients were enrolled in the study group and 85 age and sex matched controls were also enrolled. Average age of patients was 43.2 +/- 14.78 years, median age of patients was 40 years. Male to

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female ratio was 2.2:1 (chart 1 shows the age and sex distribution of patients). Maximum number of patients belong to 3rd and 4th decade. Majority of patients in the study were illiterate (55%). 52% patients in the study belong to lower socio economic class according to modified BG parsad classification.

14% of patients had positive smoking history, 20% had positive alcohol intake history. There was no association found between history of alcohol and smoking intake and frequency of metabolic syndrome. Correlation coefficient between age of patients and frequency of metabolic syndrome came out to be 0.10 (Positive but weak correlation). Correlation coefficient between duration of disease and frequency of metabolic syndrome came out to be 0.08 (positive but very weak correlation).

30% of patients had grade 4 PASI score (above 10 score), 28% had grade 2 PASI score (5-8 score). Table 1 shows distribution of PASI score among the psoriasis patients. Among Psoriasis patients the frequency of metabolic syndrome was maximum in 31-40 years of age group but among control group frequency of metabolic syndrome was equally distributed among all age groups. Chart 2 shows the distribution of metabolic syndrome according to the age group among both case and control group.

Mean disease duration was 5.1 years, median disease duration was 4 years and standard deviation of disease duration was 3.97 years. Odds ratio from this data came out to be 2.04, which means there are more chances of finding metabolic syndrome in psoriasis patients than the healthy controls. Table 2 and chart 3 shows frequency of metabolic syndrome was more in the psoriasis group than the control group. Using Chi-squared Test (χ^2 Test) the p-value came out to be 0.031 with confidence interval of 95%, which shows the result to be statistically significant.

Chart 1: shows the age group wise frequency of patients according to sex.

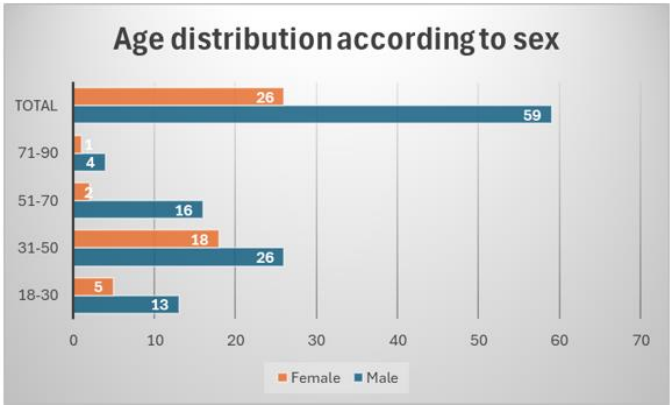

Table 1: Frequency of patients according to the PASI score grades

Grade	No. of patients	Percentage
1 (0-5)	19	22
2 (5-8)	24	28
3 (8-10)	17	20
4 (Above 10)	25	30
Total	100	100

Chart 2: Age wise distribution of metabolic syndrome in both case and control group

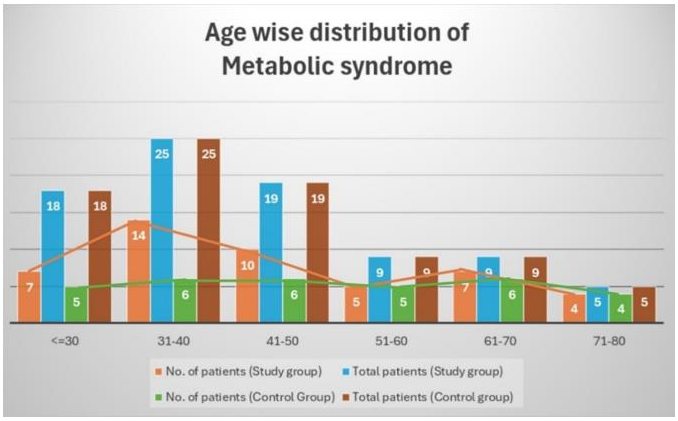

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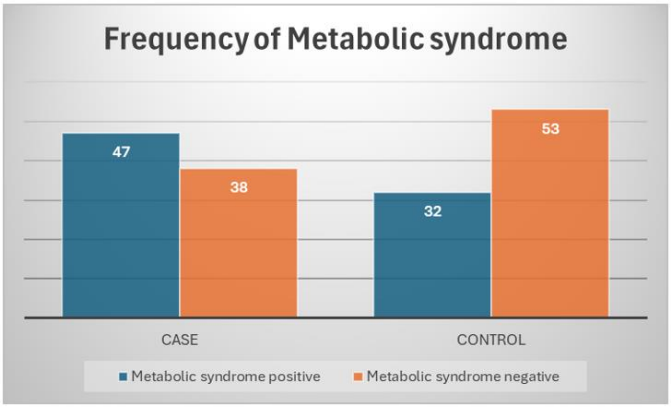
Table 2: Frequency of Metabolic syndrome

	Case Group	Control Group
Metabolic syndrome positive	47 (55%)	32 (38%)
Metabolic syndrome negative	38 (45%)	53 (62%)

Chart 3: Frequency of Metabolic syndrome



Discussion

Psoriasis affects nearly 2-3% of the world's population and presents as erythematous, indurated, scaly plaques over the skin sometimes with involvement of the nails and joints.[5] It is a multi-system inflammatory disease where the skin and the joints are the primary targets. There are many reports that psoriatic patients tend to have concurrent illnesses that are termed as comorbidities, like psoriatic arthritis, but recent studies in western population highlighted the association between psoriasis and diabetes, obesity, dyslipidemia and cardiovascular disorders, though there are remarkably few studies from India.[5]

The present case control study enrolled 85 patients of psoriasis, in the age group of 18 to 90 years, selected randomly from outpatient department of DVL, MGMMC, Kishanganj and their severity of disease was quantified and were assessed for metabolic syndrome using SAM NCEP-ATP III criteria for diagnosing MS, additionally 85 age and sex matched heathy controls were also taken and were assessed for metabolic syndrome.

The overall prevalence of MS in our study, according to the SAM NCEP- ATPIII criteria, was 55% among psoriasis patients and 38% in control group. Two Indian studies conducted in normal population, which differed in their definition of obesity: first using the modified NCEP ATPIII criteria suitable for Indians, done in Jaipur[9], while the second study from Chennai[10] using the EGIR criteria, found a prevalence of metabolic syndrome 13% and 11.2% respectively. Compared with the prevalence of metabolic syndrome in general population, prevalence was nearly triple among those with psoriasis and excess prevalence remained substantial after adjustment for covariates like age, sex, BMI, smoking status and alcohol. These findings may partially explain the increased future risk of cardiovascular-metabolic morbidity and mortality among individuals with psoriasis reported in previous studies. In a recent study to estimate the prevalence of metabolic syndrome in US population using NCEP criteria[11], the prevalence of metabolic syndrome was 40% among psoriasis cases and 23% among controls. Almost similar results were observed in a good volume, cross sectional study by Gisondi et al[12], which showed a prevalence of 30.1% in psoriasis patients vs 20.6% in controls and in case control study conducted by Khunger N[13], which showed a prevalence of MS in 30% in psoriasis patients vs 8% in controls. This shows the association of psoriasis and metabolic syndrome, but a better prospective Cohort study is required in the future to further solidify the association. It implies to consider psoriasis as a risk factor for metabolic syndrome, better screening of metabolic syndrome in

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psoriasis patients can help in early detection and prevention.

In the present study, there was a wide variation of age range from 18 years to 90 years. The mean age of patients at presentation was 43.2 years, which was similar to other studies like Fortune et al[14] observed 42.7 years, Manjula et al102 observed 45 years, while it was 38.42 years by Rakesh et al.[15] This indicates that the peak age of psoriasis in our study falls within the middle age group.

We observed the maximum number of patients with MS in the age group of 3rd decade (29%), 4th decade (22%), 5th decade (11%), 14% and 15% in 2nd and 6th decade respectively. In control group the maximum frequency of metabolic syndrome found in 3rd, 4th and 6th decade with 19%. The results from the present study are similar with the results of the study conducted by Bener A et al[16] who found the prevalence of MS peaked in the 30-39 years age group. Criteria for Metabolic syndrome is not standardized for particular age groups. As age increases the risk factor for obesity and hypertension also increases, high prevalence of metabolic syndrome in middle age groups could be attributed to that. In future studies this bias could be mitigated by modifying the criteria for Metabolic syndrome according to the age group.

Out of 85 cases, 59 were males and 26 were females. Male: female ratio was 2.2:1. A high male preponderance seen in our study correlates with other published studies. Pakran et al[17] revealed a sex ratio of 2.3:1in their studies. Thus, the sex ratio in our study correlated with the above literature. This finding could be attributed to the more tendency of males to seek treatment than females, as the present study was a hospital-based study. A population-based study could rectify this bias and can provide better understanding of prevalence in males compared to females.

Out of 59 male patients, 31(52.5%) had MS and in total 26 female patients, 16(61.5%) had MS. Pemminati et al[18] found a higher prevalence of MS among females as compared to males. The difference could be due to different criteria used for the diagnosis of metabolic syndrome in other studies. Furthermore, the female preponderance could be attributed to the fact that after menopause there is more tendency of central obesity and cardiovascular diseases in females that can be confounded in the findings.

55% of patients in study group had fulfilled the criteria for Metabolic syndrome and 38% in control group, from which the Odds ratio came out to be 2.04, which shows there are more chances of finding Metabolic syndrome in Psoriasis patients than the healthy controls. The p-value came out to be 0.031 which is statistically significant. This finding is similar to the finding in study by Madanagobalne S and Anadan S[19], who found metabolic syndrome in 44.1% in case group and 30% in control group, odds ratio 1.99 with p-value of 0.025. This suggests that the likelihood of detecting metabolic syndrome is higher in patients with psoriasis compared to the general population. However, as these findings are derived from case-control studies, they do not establish a causal relationship. Further prospective studies are necessary to strengthen and clarify this association.

Conclusion

At the end of the study we come to the conclusion that:

In study group out of 59 males 52.5% had metabolic syndrome, out of 26 females 61.5% had metabolic syndrome and in control group out 59 males 42% had

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metabolic syndrome, out of 26 females 49% had metabolic syndrome.

The maximum number of patients with metabolic syndrome belong to the 3rd and 4th decade of age group in both study and control group.

There was no significant association found between the history of alcohol (p-value 0.45) or smoking (p-value 1.00) and frequency of metabolic syndrome in both study and control group.

Odds ratio of case control groups was 2.04 (p-value 0.031), show there is more chances of finding Metabolic syndrome in psoriasis group than the control group and this finding was statistically significant.

There was a positive but weak association between Age of patients (correlation coefficient 0.10), Duration of psoriasis (correlation coefficient 0.08) and Frequency of Metabolic syndrome. However, there was a positive association between severity of psoriasis and Frequency of Metabolic syndrome (correlation coefficient 0.54).

The findings were not statistically significant.

This study indicates the necessity of regular screening of psoriasis patients for the detection of metabolic syndrome in order to avoid future consequences.

Limitations

1. The number of patients in control group was insufficient to significantly widen the confidence interval of Odds ratio.
2. The sample size of study was relatively low. Quantitative assessment of alcohol intake or smoking was not done.

Association between the individual components of Metabolic syndrome with other variables was not assessed.

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