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Association between Metabolic Syndrome and Psoriasis – A Case Control Study

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ABSTRACT

Background

Psoriasis, a chronic inflammatory skin condition, has been related to a variety of systemic illnesses, including metabolic problems. However, there are other references in the literature that contradict this relationship. As a result, this study was carried out to determine the exact nature of the existing link between psoriasis and cases of metabolic syndrome.

Methods

A case control study was conducted among psoriasis cases and non-psoriasis controls in the outpatient department of Dermatology. A total of 140 people with 70 cases and controls each. Complete clinical history, examination including blood pressure, waist circumference, BMI, and blood investigation was done. The data was imported into Microsoft Excel and analyzed with SPSS version 18.

Results

There were 23.6% and 13.6% participants with metabolic syndrome among the cases and controls, respectively and the cases with psoriasis were 2.4 times at higher odds of having metabolic syndrome. Psoriasis was found to be significantly associated with waist circumference, lipid levels, and diabetes mellitus.

Conclusion

Metabolic Syndrome is widespread in psoriasis patients, and symptoms such central obesity, low HDL, and high fasting blood sugar should be investigated further. Because psoriasis is such a common disease with such a high burden in our general population, the dermatologist has a unique opportunity to serve as a transformative agent by improving the chances of survival for this group of patients.

Key Words: Psoriasis, Metabolic Syndrome, case control study, diabetes mellitus

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INTRODUCTION

Diabetes mellitus, hypertension, obesity, and hyperlipidemia are all components of the metabolic syndrome (MS). The metabolic syndrome is believed to affect up to 15% of the population in the United States. The pathogenesis of metabolic syndrome is complicated and only poorly understood. Most individuals have some level of insulin resistance, but whether this is the origin of the metabolic syndrome or a side effect of a more extensive metabolic disorder is a matter of controversy. Systemic inflammation may play a role, as a number of inflammatory markers are frequently elevated in MS cases[1]. Inflammatory illnesses, such as systemic lupus erythematosus and rheumatoid arthritis, have been linked to an increased risk of MS related diseases in recent research [2,3].

A cluster of risk factors known as metabolic syndrome is a powerful predictor of cardiovascular disease, diabetes, and stroke [4,5]. The significance of metabolic syndrome is that it may carry a cardiovascular risk that is greater than the sum of its parts. After accounting for traditional cardiovascular risk factors, men with metabolic syndrome are 3 times at higher chances of death due to coronary heart disease[6]. In the last ten years, it has become clear that psoriasis is a chronic inflammatory disease caused by immune system changes involving T cells[7]. Proinflammatory cytokines such as IL-6 and TNF- are elevated locally and systemically in psoriasis [8,9]. Proinflammatory cytokines, which are produced during chronic inflammation, are suspected of enhancing atherogenesis and peripheral insulin resistance, resulting in hypertension and type II Diabetes Mellitus [9,10].About 3% of the population suffers from psoriasis[11]. Psoriasis can be linked to various illnesses, which can have a significant influence on patients. Psoriatic arthritis and anxiety-depression illness are two of most prevalent comorbidities[12]. Several studies have previously found a link between psoriasis and diabetes mellitus, hypertension, cardiovascular disease and obesity [13-15]. Recent research has found a link between psoriasis and metabolic disorders such obesity, dyslipidemia, and type II diabetes, as well as a link between severe psoriasis and an elevated mortality risk from cardiovascular diseases [16,17]. However, there are contradicting findings noted with psoriasis with psoriasis and MS. Hence this study was conducted to assess the exact prevailing association between the psoriasis and metabolic syndrome cases.

METHODOLOGYOLOGY

During the months of August 2021 and February 2022, the department of Dermatology, Venereology, and Leprosy at Sri Muthukumaran Medical College Hospital and Research Institute conducted a case control study among cases attending the outpatient department. All outpatient cases with psoriasis were included as cases, and controls were matched for age (±2 years) and gender who were free of psoriasis. Immunocompromised participants were not allowed to participate in the trial. The study comprised a total of 140 participants, with 70 cases of psoriasis and 70 healthy controls.Individual participants were informed about the study and promised that their identities would be kept totally confidential, and that they had the option of declining to participate. Prior to the interview, the study subject signed a written informed consent form. Every effort was made to ensure that all information obtained from participants was kept private. A proforma was used to conduct the study, which included a full clinical history as well as an examination. Blood pressure, waist circumference, and BMI were all measured. Fasting blood sugar (FBS), triglycerides (TGL), and high-density lipoprotein (HDL) levels were all measured using a venous sample. 7 The current National Cholesterol Education Program (NCEP) - Adult Treatment Panel (ATP) III standards describe metabolic syndrome as the presence of three or more of the five characteristics listed below[18].

- Serum triglycerides 150 mg/dL or pharmacological treatment for increased triglycerides
- Abdominal obesity, defined as a waist circumference of 102 cm in men and 88 cm in women.
- HDL cholesterol of 40 mg/dL in men and 50 mg/dL in women, or treatment for low HDL cholesterol with medication
- Blood pressure 130/85 mmHg or treatment for high blood pressure with medication
- Fasting plasma glucose of less than 100 mg/dL or medication treatment for high blood sugar.

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Data was entered in MS excel and analysis was done using SPSS version 18. Descriptive statistics, odds ratio, chi square test and independent sample t tests were done, appropriately. P value <0.05 was found to be statistically significant.

RESULTS

Based on the age-wise distribution of the study participants, 2.9 %participants, 2.9% of the participants were below 20 years of age, 22.9% of them were between 21-30 years of age and 20% of the participants were between 31-40 years of age. In the age range of 41-50 years and 51-60 years there were 34.3% and 17.1% of the participants respectively. Above 60 years of age 2.9% participants were recorded. Among all the participants 50% were males and other 50% of the participants were females. On assessment of occupational status 59 participants from the case from the case group and 64 participants from the control from the control group were employed. Addictions were noted among 20.7% of the study participants of whom 11.4% were cases and 9.3% were controls, but the difference between psoriasis cases and controls for addiction was not significant statistically.Among the cases, based on the type of psoriasis the most common type noted in our study was plaque type (67.2%) followed by palmoplantar psoriasis and scalp psoriasis were 14.2% and 11.4% of the cases were seen respectively. Erythrodermic type of psoriasis was found among 5.8% cases and guttate psoriasis was seen in 1.4% of the cases. Psoriasis area and severity index (PASI) score was found to be mild in 4.2% of the cases, moderate in 57.2% of the cases and severe in 38.6% of the cases.Among 37.1% participants with metabolic syndrome 23.6% were psoriatic cases and 13.6% participants were from controls. There was a significant was a significant statistical difference noted between cases and controls for metabolic syndrome (p value = 0.014). Also, it was noted that the odds of having metabolic syndrome among psoriasis patients were 2.4 times higher compared to the control to the control group.

Table 1: Association between Metabolic syndrome among cases and controls

Metabolic syndrome	Cases	Controls	Total	Odds Ratio	P value
Present	33 (23.6)	19 (13.6)	52 (37.1)	2.4 (1.2 - 4.8)	0.014*
Absent	37 (26.4)	51 (36.4)	88 (62.9)		
Total	70 (50.0)	70 (50.0)	140 (100.0)		

**Significant*

Proportion of cases with abnormal waist circumference, TGL levels and fasting blood sugars among cases were significantly higher and the association was found to be statistically significant. However, the difference in hypertension, HDL levels between the cases and controls was statistically insignificant in this study.

Table 2: Difference between psoriasis cases and controls based on certain variables

Variables	Cases	Controls	Total	P value
Waist circumference				
Abnormal	30 (21.4)	18 (12.9)	48 (34.3)	0.033*
Normal	40 (28.6)	52 (37.1)	92 (65.7)	
Total	70 (50.0)	70 (50.0)	140 (100.0)	
Hypertension				
Present	26 (18.6)	20 (14.3)	46 (30.7)	0.280
Absent	44 (31.4)	50 (35.7)	94 (67.1)	
Total	70 (50.0)	70 (50.0)	140 (100.0)	
TGL levels				
Elevated	31 (22.1)	19 (13.6)	50 (35.7)	0.034*
Normal	39 (27.9)	51 (36.4)	90 (64.3)	
Total	70 (50.0)	70 (50.0)	140 (100.0)	
HDL levels				
Reduced	34 (24.3)	31 (22.1)	65 (46.4)	0.611
Normal	36 (25.7)	39 (27.9)	75 (53.6)	
Total	70 (50.0)	70 (50.0)	140 (100.0)	
Fasting blood sugars				
Elevated	38 (27.1)	21 (15.0)	59 (42.1)	0.004*
Normal	32 (22.9)	49 (35.0)	81 (57.9)	
Total	70 (50.0)	70 (50.0)	140 (100.0)	

**Significant*

The mean difference in age, body mass index, systolic and diastolic blood pressure, and high-density lipoprotein among cases and controls was found to be similar without any statistical significance. However, mean difference in waist circumference, triglycerides and fasting blood sugars were comparatively high among the cases and the difference was found to be statistically significant

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Table 3: Mean difference between Psoriasis cases and control group for certain parameters

Parameters	Cases	Controls	P Value
Age (in years)	40.13±12.39	42.51±11.11	0.233
Body mass index	27.285±3.84	27.50±3.00	0.714
Waist circumference (cms)	95.6±14.3	91.3±9.1	0.036*
Systolic blood pressure (mmHg)	124.29±12.22	121.43±10.75	0.143
Diastolic blood pressure(mmHg)	82.71±7.59	83.14±5.25	0.699
Triglycerides (mg/dl)	156.90±46.76	141.26±22.84	0.013*
High density lipoprotein(mg/dl)	42.2±4.4	43.5±4.3	0.079
Fasting blood sugars (mg/dl)	102.53±13.78	98.54±9.07	0.045*

DISCUSSION

Psoriasis is a chronic inflammatory condition of skin that has a high risk of cardiovascular disease. A higher risk of arterial and venous thrombosis[19], as well as a higher risk of myocardial infarction, has been described, particularly in young patients with severe psoriasis[20]. Cigarette smoking, dyslipidemia dyslipidemia, obesity, physical inactivity, hyperhomocysteinemia, and psychological stress, all of which are more common in psoriasis patients, may all have a role in this elevated cardiovascular risk[21]. In psoriatic patients, a clear association between the severity of psoriasis and the prevalence of obesity, dyslipidemia, and hyperhomocysteinemia has been reported suggesting that psoriatic skin changes have a direct role in determining these risk factors[22].Psoriasis was found to be linked to waist circumference, lipid levels, and diabetes mellitus in the current investigation. Our findings back up those of Henseler et al[23], Herron et al[24], and Mallbris et al[25]. In line with these investigations, our research found a probable link between psoriasis and metabolic and metabolic syndrome.

In a research, Cohen AD et al[26] found that the average age of case patients was 47.7 years. Men made up 50.3 percent of the population, while women made up 49.7%. Ischaemic heart disease was observed in 23.5 percent of psoriasis patients compared to 17.2 percent of the controls, a statistically significant difference. Diabetes mellitus was found in 27.9% of psoriasis patients and 19.5 percent of controls (non psoriasis controls). Hypertension was seen in 44.4 percent of psoriasis patients compared to 37.2 percent of healthy controls. Obesity was seen in 29.4 percent of psoriasis patients compared to 23.5 percent of the controls. Dyslipidemia was seen in 50.9 percent of psoriasis patients compared to 44.2 percent of the controls. The proportion of patients and controls with diabetes mellitus, hypertension, obesity, and dyslipidemia was shown to be statistically significant. After the age of 50, the link between psoriasis and the metabolic syndrome became more prominent, especially in men. In a study conducted by Zindanci I et al[27], metabolic syndrome, diabetic mellitus, and hypertension were found to be greater in psoriasis sufferers as compared to the control group. Psoriasis patients had a three-fold increase in metabolic syndrome, which was much more prevalent in women than in males. After the age of 40, the prevalence of metabolic syndrome was found to be greater in psoriasis patients. Smoking, psoriasis severity, or disease duration had no effect on metabolic syndrome.When controlling for age and gender, Kin GW et al[28] found no statistical link between psoriasis and the prevalence of metabolic syndrome in their investigation. Only elevated triglyceride levels were particularly frequent in psoriasis patients among the specific components of metabolic syndrome. Other indicators such as central obesity, hypertension, fasting plasma glucose, and HDL were similar to or lower in the psoriasis group than in the control group. Despite the fact that psoriasis patients with metabolic syndrome exhibited severe and big plaque-type psoriasis, the connection between metabolic syndrome and psoriasis severity or clinical subtype was not significant after age and gender were taken into account. They came to the

conclusion that psoriasis and metabolic syndrome are unrelated.

Psoriasis and the metabolic syndrome were investigated by Cohen AD et al[29]. In which, diabetes mellitus was found in 13.8 percent of psoriasis cases and 7.3 percent of controls, according to the researchers. Hypertension was found in 27.5 percent of psoriasis patients and 14.4 percent of the controls. Obesity was seen in 8.4 percent of psoriasis patients compared to 3.6 percent of the controls. Ischemic heart disease was found in 14.2 percent of psoriasis patients compared to 7.1 percent of control patients. There was a strong link between diabetes mellitus, hypertension, obesity, and ischemic heart disease in both psoriasis cases and controls.

After the age of 40, metabolic syndrome was substantially more common in psoriatic cases than in controls, according to Gisondi P et al[30]. Hypertriglyceridemia and abdominal obesity were also more common in psoriatic individuals, although hyperglycemia, arterial hypertension, and plasma levels of high-density lipoprotein cholesterol were similar. Despite the fact that psoriasis patients were more likely to smoke, the link between psoriasis and metabolic syndrome was independent of smoking. There was no link between psoriasis severity and the prevalence of metabolic syndrome. In comparison to psoriatic cases without metabolic syndrome, that with metabolic syndrome was older and had a longer disease duration. According to Danielson K et al[31], men and women with psoriasis have a uniformly greater prevalence of metabolic syndrome than those without across all age categories in their study. Psoriasis was linked to a 3 to 8 times increased risk of metabolic syndrome in women aged 30 years, with the risk ratio decreasing with age. Psoriasis was linked to a constant 1 to 35-fold increased risk of metabolic syndrome in males of all ages. The most common metabolic syndrome element in women in this study was abdominal obesity, and there was evidence of a dose–response link between psoriasis severity, as measured by therapy, and having a large waistline in women.According to a study by Ferdinando LB et al[32], MS incidence in psoriasis cases was 49.4 percent, whereas the same in controls was 35 percent, with the difference being statistically significant. Psoriasis patients had a higher BMI, systolic blood pressure, lower HDL cholesterol, higher glucose, a larger waist circumference, and more angina pectoris than controls, with all of these changes being significant. When psoriasis cases with MS were compared to those without MS, those with MS were older, had illness onset at an older age, had higher cigarette exposure, and had a lower likelihood of scalp involvement. In another study Milcic D et al[33] stated that individuals with psoriasis have a higher prevalence rate and its components than controls, independent of disease severity, emphasizing the importance of medical intervention and follow-up of all psoriatic cases with relation to metabolic illnesses. Based on random effects analysis, Singh S et al[34] conducted a meta-analysis study and found that cases with psoriasis have a 2.14 times higher risk of metabolic syndrome than controls without psoriasis. In a systematic review and meta-analysis, Armstrong AW et [35] found that the pooled odds ratio for metabolic syndrome among those with psoriasis was 2.26 when compared to the general population. The Egger test and a visual assessment of a funnel plot suggested publishing. Also, Rodriguez Zuniga MJM et al[36] looked at the link between psoriasis and MS and discovered that MS was present in 31.4 percent of psoriasis cases.In a study, Langan SM et al[37] found that psoriasis is linked to metabolic syndrome, and that the link is stronger as the condition progresses. Furthermore, independent of other metabolic syndrome components, correlations with obesity, hypertriglyceridemia, and hyperglycemia grow with increasing illness severity. They suggested that psoriasis patients be screened for metabolic disorders, especially if the condition is severe. In another study, Salihbegovic EM et al[38] found a 38.57 percent prevalence of metabolic syndrome in psoriasis patients. The PASI score was 16,65 on average. The rise in PASI scores and the onset of metabolic syndrome were statistically linked. Sommer DM et al[39] conducted a study and found a distinct pattern of chronic disorders, including diabetes mellitus type II, arterial hypertension, hyperlipidemia hyperlipidemia , and coronary heart disease, to be significantly associated with psoriasis. The metabolic syndrome, which includes these illnesses as well as obesity, was clearly more common in psoriasis patients. Furthermore, psoriasis patients were much more likely to be smokers and to consume alcohol on a frequent or heavy basis.In contrast to the above findings, metabolic syndrome was more frequent in psoriatic patients than in controls, according to Praveenkumar U et al[40], but the difference was statistically negligible. When

compared to controls, the psoriasis showed higher frequency of elevated blood glucose levels and a larger waist circumference. High triglyceride levels were more common in psoriasis patients than in controls, but the difference was statistically insignificant. When comparing cases to controls, the prevalence of low HDL levels was considerably greater in patients. There was no link between having metabolic syndrome and having psoriasis for a long time. Also, Lakshmi S et al[41] in their study found that psoriasis patients with MS had a significantly higher mean age than those without MS. MS was found in 32.5 percent of psoriasis cases and 30% of controls; however, the difference was not significant. In psoriasis patients, older age and female gender were linked to the occurrence of MS. MS was found to be statistically unrelated to the psoriasis area severity index score or body surface area involvement in psoriasis cases.

CONCLUSION

To conclude, Metabolic Syndrome is common in psoriasis patients, and findings such as central adiposity, poor HDL, and fasting blood sugar levels warrant further attention. Because psoriasis is a very widespread disease with a significant burden in our general population, the dermatologist has a significant responsibility to serve as a transformative agent by increasing the chance of survival of this group of cases.

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