Original Research Article

Association of metabolic syndrome with psoriasis: a hospital based cross-sectional study

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Abstract

Background: Psoriasis is associated with significant morbidity which may have a significant impact on the quality of life of patients even if a relatively limited body surface area is involved.**Aims:** The present study was aimed to assess the association of psoriasis and metabolic syndrome and to evaluate the disease activity and duration in psoriatic patients with and without metabolic syndrome.**Materials and Method:** 85 psoriasis subjects without prior systemic treatment for 1 month were included. A complete lipid profile with fasting blood glucose levels, blood pressure, and central obesity were assessed and the results were formulated. **Results:** 33 out of 85 patients had metabolic syndrome. Impaired HDL levels and fasting triglyceride of metabolic syndrome seen in 60% and 55.2% respectively. Metabolic syndrome and the extent of body surface area involved by psoriasis were directly associated. Patients with psoriasis of more than 72 months had more metabolic syndrome (37.84%). There was no significant correlation between PASI score and metabolic syndrome. **Conclusion:**The present study concludes that there exists an association between psoriasis and metabolic syndrome. This has important implications in dermatology to prevent associated serious complications.

Keywords: Dyslipidemia, Hyperglycemia, Metabolic Syndrome, Psoriasis, Psoriatic complications, Obesity.

Introduction

Psoriasis is a common and chronic inflammatory disease, mediated by T cells, warranting dermatologic treatment. The disease has a genetic component showing autoimmune traits and genetic predilection[1].Globally, psoriasis affects approximately 2% of the human population. However, the prevalence shows geographical variations with high occurrence in Scandinavians and Caucasians and low occurrence in Africans and Asians. Previous literature reports a varying prevalence of as low as 0.84% and a high prevalence of 5.6% by various researchers[2].Clinically, Psoriasis presents as scaly, red indurated plaques that are sharply demarcated affecting the scalp and extensor surfaces preliminarily. Psoriasis has a complex and prominent genetic component and is characterized by inflammatory processes and hyperproliferation of keratinocytes mediated by T-cells. The mortality rate with Psoriasis is very low. However, significant morbidity is associated with Psoriasis affects the quality of life in subjects even with minimal involvement of body surface area[3]. Metabolic syndrome (MS) includes a group of risk factors such as diabetes, obesity, hypertension, dyslipidemia, and/or atherosclerosis. Metabolic syndrome is a reliable predictor of cardiovascular diseases.Psoriasis has been associated with metabolic syndrome as suggests by various authors in previous literature.[4] The association of Psoriasis has been already established to the various components of metabolic syndrome including diabetes, obesity, hypertension, and dyslipidemia. Recently, Psoriasis is also linked to the atherosclerotic component of metabolic syndrome[4,5].Psoriatic skin is associated with the expression of various inflammatory mediators including TNFα, IL-1, IL-6, and IL-8 which are thought to be induced primarily by IL-17. This IL-17 is also found in subjects with acute Myocardial Infarction and angina with C-reactive protein, IL-6, and 8[6].The common occurrence of these mediators in both diseases establishes a possible association between the two. Also, metabolic syndrome is seen in 30% to 50% of the subjects with Psoriasis affecting the overall health of the subjects with Psoriasis.[7] Hence, the present clinical trial was conducted to assess the association of psoriasis and metabolic syndrome and to evaluate the disease activity and duration in psoriatic patients with and without metabolic syndrome.

Materials and methods

The present clinical trial was conducted to assess the association of psoriasis and metabolic syndrome and to evaluate the disease activity and duration in psoriatic patients with and without metabolic syndrome. The study was conducted on patients with psoriasis attending the outpatient department of Dermatology, Venereology and Leprosy, LLRM Medical College, and SVBP Hospital, Meerut from June 2019 to March 2020 after obtaining ethical clearance by the Institutional Ethical forum. After obtaining clearance and approval from the ethical committee of LLRM Medical College, all patients attending the Department of DVL were screened and a

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diagnosis of Psoriasis was made based on clinical examination. In doubtful cases, the diagnosis was confirmed with histopathological examination. All the diagnosed cases were enrolled in the study after taking informed consent.

A total of 85 subjects were enrolled in the study based on the following inclusion criteria: patients with definitive Psoriasis, patients with no other systemic disease and medication, patients who gave consent for participation in the study, subjects with an age of 18 years or more. Pregnant and lactating females, minors, and subjects under systemic medication such as Methotrexate, Acitretin, Apremilast, and Cyclosporin in the span of the last 1 month were excluded from the study. For the enrolled 85 subjects, serum cholesterol including HDL and triglycerides, blood pressure, and blood glucose levels were recorded. A detailed history including demographic data, medical history, drug history, personal history, and family history was also recorded for the study subjects. Waist circumference was also recorded for all the subjects.

To determine the severity of psoriasis, PASI [Psoriasis Area and Severity Index] and BSA [Body Surface Area] scores were used.

PASI scoring was done according to following formula:

PASI=0.1(Eh+Ih+Dh)A + 0.2(Eu+Iu+Du)A + 0.3(Et+ It+Dt)A + 0.4(El+Il+Dl)A

where E=Erythema, I=Induration, D=Desquamation, h=Head, u=Upper limb, t=Trunk, and l=Lower Limb.

The scores can vary from 1-72 in steps of 0.1.

I >15.

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 study subjects were divided into two groups: BSA <10% and BSA >10%.Metabolic Syndrome was diagnosed using modified NCEP (National Cholesterol Education Program's Adult Treatment Panel III) criteria if ≥3 of the below parameters were present:

- Fasting glucose ≥100 mg/dl.
- Blood pressure ≥130/85 mm Hg
- Triglycerides ≥150 mg/dL
- HDL < 40mg/dL in males and <50 in females
- Waist circumference ≥102 cm (40 in) in men or ≥88 cm (35 in) in women.

Results

The present clinical trial was conducted to assess the association of psoriasis and metabolic syndrome and to evaluate the disease activity and duration in psoriatic patients with and without metabolic syndrome. The study included both males (n=49) and females (n=36) from the age range of 18 years to 70 years with a mean age of 37.2 years. All the types of psoriasis were observed in the study subjects including scalp psoriasis, palmoplantar type, and chronic plaque type. The most commonly encountered in the present study was chronic plaque-type, seen in 58.88% (n=50) study subjects, followed by palmoplantar type in 21.17% (n=18) subjects, and scalp psoriasis is seen in 20% (n=17) subjects. The demographic characteristics of the study subjects are described in Table 1.

Concerning metabolic syndrome assessment, various components including obesity via waist circumference, blood pressure, blood glucose levels, HDL levels, and triglyceride levels were evaluated. The results are summarized in Table 2. NTEP ATP III definition was considered to take cut-offs for all parameters of metabolic syndrome.For waist circumference for males and females, cut-off values of 102cm and 88cm were considered. Abnormal waists were seen in 31.76% (n=27) subjects who had abnormal waist including 17 (62.9%) females, and 10 (37.02%) males. For hypertension, cut-off as >130 systolic and>85mm Hg diastolic was considered. 33 of study subjects presented hypertension including 54.5% (n=18) males and 45.45% (n=15) females.>100mg/dl was taken as the cut-off for plasma glucose level, where impaired levels were seen in 29 out of the total 85 patients. 17 of these patients were females constituting 58.6% and the remaining 12 patients were males (41.3%). Regarding Triglycerides, a cut-off value of >150 mg/dl was taken. Impaired levels were seen in 47 out of the total 85 patients (Table 2). 30 of these patients were males constituting 63.8% of the patients and the remaining 17 patients were females (36.17%). Concerning HDL, a cut-off value of < 40 mg/dl was taken for males, and < 50 mg/dl was taken for females. Impaired levels were seen in 51 out of the total 85 patients. 27 of these patients were females constituting 52.9% of the patients and the remaining 24 patients were males (47%).Central obesity was seen in 66.6% of the patients with metabolic syndrome whereas it was seen only in 9.61% of patients without metabolic syndrome. Hypertension was seen in 75.75% of patients with metabolic syndrome as opposed to 15.3% of patients without metabolic syndrome. Impaired fasting glucose was seen in 54.54% of the patients with metabolic syndrome and 21.15% of patients without metabolic syndrome. Hypertriglyceridemia was seen in 90.9% of the patients with metabolic syndrome and 32.69% of patients without metabolic syndrome. Low HDL levels were seen in 72.7% of the patients with metabolic syndrome and 51.9% of patients without metabolic syndrome..Metabolic syndrome was seen in 38.82% (n=33) subjects. Among 33 cases, psoriasis involved >10% of BSA (body surface area) in 30 cases (90.9%), whereas < 10% of BSA was affected in 3 cases (9.1%). This difference was statistically significant (p=0.012) as evaluated by Pearson Chi-Square Test. Of the 33 patients with metabolic syndrome, 39.4% (n=13) had a duration of>72 months showing an increasing trend with the duration of the disease.

Concerning PASI,study subjects were broadly divided into 2 groups which were <15 PASI and >15 PASI. Of 33 patients with metabolic syndrome, 25 (75.75%) cases had<15 PASI, whereas 8 (24.24%) subjects had > 15 PASI. The difference was not statistically significant (p=0.641) as shown in Table 3.

Table 1: Demographic Characteristics of the study subjects

Characteristic		Number (n)	Percentage (%)
Age Range (years)	18-70		
Mean age (years)	37.2		
Sex			
Males		49	57.64
Females		36	42.35
Psoriasis Type			
Chronic Plaque type		50	58.88
Palmoplantar type		18	21.71
Scalp Psoriasis		17	20

Table 2: Assessment of Metabolic syndrome components in study subjects

Metabolic Syndrome Component	Males	Females	Total
Central Obesity (waist circumference)			
Normal	67.24(n=39)	32.75(n=19)	58
Abnormal	37.02% (n=10)	62.9(n=17)	27
Hypertension			
Normal	59.61(n=31)	40.38(n=21)	52
Abnormal	54.5(n=18)	45.45(n=15)	33
Fasting Glucose Levels			
Normal	66.07(n=37)	33.92(n=19)	56
Abnormal	58.6(n=17)	41.3(n=12)	29
Triglycerides			
Normal	50(n=19)	50(n=19)	38
Abnormal	63.8(n=30)	36.17(n=17)	47
HDL levels			
Normal	73.5(n=25)	26.47(n=9)	34
Abnormal	47(n=24)	52.9(n=27)	51

Table 3: BSA and PASI in study subjects with metabolic syndrome

Parameter				
	Metabolic Syndrome			**p-value**
	Present	**Absent**	**Total**	
BSA involvement				
<10%	3(9.1%)	17(32.6%)	20	0.012
>10%	30(90.9%)	35(67.3%)	65	
PASI	**Present**	**Absent**	**Total**	
<15	25(75.75%)	37(71.15%)	62	0.641
>15	8(24.24%)	15(28.84%)	23	

Discussion

The present clinical trial was conducted to assess the association of psoriasis and metabolic syndrome and to evaluate the disease activity and duration in psoriatic patients with and without metabolic syndrome.The study results showed that the most common type of Psoriasis seen in study subjects was chronic plaque-type in 58.8% (n=50) subjects. These findings were in agreement with the study of Neimann AL et al[8] in 2006 where plaque-type psoriasis was seen in 90% of the patients.It was seen that 38.82% (n=33) patients were affected by metabolic syndrome, out of which 57.57% were males. Central obesity was seen in 31.76% of the patients out of which 62.9% of patients were females. This was similar to studies conducted by Gisondi et al[9] in 2007, (57.1% vs 47.6%),and Jacob Drehier and Dahlia[10] in 2008 with 24% vs 17.9%.Impaired fasting glucose (IFG) was seen in 34.1% of the patients of which 58.6% were females. Hypertension was found in 38.82% of patients of which 54.5% were males. Impaired triglyceride levels were seen in 47 (55.29%) out of the total 85 patients of which 63.8% were males. These findings were consistent with the previous findings of Shapiro J et al[11] in 2007, Cohen et al[12] in 2008, and Barclay L[13]in 2010 where similar findings in Psoriasis subjects with metabolic syndrome were seen concerning diabetes, hypertension, and dyslipidemia. 39.4% of the patients had a duration of > 72 months for Psoriasis. The occurrence of metabolic syndrome showed an increasing trend with the duration of the disease similar to the study by Gisondi et al[9] in 2007 which reported that psoriatic patients with metabolic syndrome had longer psoriasis duration and more age in comparison to psoriatic subjects with no metabolic syndrome.In the present study 33 out of the 85 psoriatic patients had metabolic syndrome which correlated with the previous studies of Isabela Guimarães Ribeiro Baeta et al[14] in 2014 where authors 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). Another study by Catherine Ni and Melvin W Chiu[15] also reported that the prevalence of metabolic syndrome ranged from 14% to 40%. Concerning BSA, in 33 patients with metabolic syndrome, psoriasis involved >10% of BSA in 30 cases (90.9%), whereas < 10% of BSA was affected in 3 cases (9.1%) This difference was statistically significant (p=0.012). These results were in line with the study of Lakshmi S et al[16] in 2014 and Joel M et al[17]in 2012 reported similar findings where the mean BSA of subjects having psoriasis was 38.50% and a direct relationship between body surface area and metabolic syndrome was established.Regarding PASI score,<15 PASI was present in 25 cases (75.75%), whereas > 15 PASI was present in 8 cases (24.24%). This was non-significant (p=0.641). The results were similar to other studies conducted byNisa and Qazi[18] in 2010 and Kim et al[19] in 2012 where authors found a significant difference in the prevalence of MS based on PASI score (P = 0.048).

Conclusion

The present study concludes that there exists an association between Psoriasis and metabolic syndrome. Also,commonly seen deranged parameters of metabolic syndrome are fasting levels of serum triglycerides and HDL cholesterol. Fasting glucose levels followed by central obesity are commonly impaired components in females. The extent of body surface area involvement of psoriasis and the presence of metabolic syndrome are associated. There was an increasing trend of occurrence of metabolic disease with a longer duration of the disease. The study had few limitations including smaller sample size, short monitoring period, cross-sectional design, single-institutional involvement, and geographical area biases. Hence, more longitudinal clinical trials with a larger sample size and longer monitoring periods are required to reach a definitive conclusion.

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