



ASSOCIATION BETWEEN PSORIASIS SEVERITY AND LIPID LEVELS

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ABSTRACT **Background:** Apart from being a skin disease, Psoriasis is being increasingly recognized for its extra-cutaneous effect, particularly related with cardiovascular risk. **Objective:** To assess the lipid levels in Psoriasis patients and to correlate them with psoriasis severity. **Method:** A total of 60 psoriasis patients aged >18 years were enrolled in the study. Lipid levels (Total cholesterol, Triglyceride, HDL and LDL) were assessed. Psoriasis severity was assessed using Psoriasis Area Severity Index (PASI). A correlation between Psoriasis severity and lipid levels was explored. Data analysis was done using SPSS 21.0 software. ANOVA and Pearson correlation coefficient were used to compare the data. **Results:** Mean age of patients was 39.37±16.53 years. Majority of patients were males (66.7%). Mean total cholesterol, triglyceride; LDL and HDL levels were 151.42±39.29, 152.53±85.33, 77.36±34.24 and 43.58±16.33 mg/dl respectively. As per PASI, a total of 9 (15%) had mild, 35 (58.3%) had moderate and 16 (26.7%) had severe psoriasis. Mean total cholesterol, triglyceride and LDL levels showed an incremental trend with increasing severity grade of PASI, however, the association was significant statistically only for Total cholesterol and triglyceride levels. There was a positive significant correlation between PASI with total cholesterol ($r=0.269$; $p=0.038$) and between PASI and Triglyceride ($r=0.368$; $p=0.004$). **Conclusion:** The findings of present study showed that psoriasis affects the lipid levels and its severity is correlated with higher lipid levels, thus showing that patients with higher grades of psoriasis have an increased cardiovascular risk.

KEYWORDS : Psoriasis, PASI, Lipid levels, Cardiovascular risk.

INTRODUCTION

Although psoriasis is recognized as a skin disease yet its chronic inflammatory nature has attracted the attention towards its association with other systemic diseases involving a chronic inflammatory etiology. Today, psoriasis is projected as a multisystem disease¹. Evidence is emerging showing its association with diseases like metabolic disorders, cardiovascular diseases (CVD), psoriatic arthritis, lymphomas, Crohn's disease and depression². Population based studies have suggested that psoriasis is associated with metabolic and cardiovascular diseases like obesity, hypertension (HTN), insulin resistance (IR), diabetes, dyslipidemia and heart diseases. It has been suggested that obesity related chronic inflammation may increase the risk of psoriasis and that weight loss may improve psoriasis³.

The studies related with pathogenesis and progression of psoriasis show that chronic inflammation in psoriasis leads to increased insulin-like growth factor-II (IGF-II) in the skin and blood of psoriasis patients⁴. Consecutively, IGF-II is known to play a role in promotion of epidermal proliferation and is also implicated in promoting atherosclerosis and is linked to development of insulin resistance and lipid abnormalities in animal and human models⁵.

Lipid abnormalities play an important role in determining the cardiovascular risk among psoriasis patients. Considering the association of chronic inflammation in psoriasis patients, it is essential that an lipid levels in psoriasis patients should be studied in order to measure the level of derangement in lipid levels caused by psoriasis. It must also be evaluated whether severity of psoriasis plays a role in determining the lipid levels. Hence, the present study was carried out to study the lipid levels in psoriasis patients and to find out whether there is an association between lipid levels and severity of psoriasis.

MATERIAL AND METHOD

The present study was carried out at Era's Lucknow Medical College & Hospital, Lucknow, as a retrospective chart review of records of all the adult psoriasis patients aged >18 years visiting the facility for treatment of psoriasis over the last one year. Demographic details (age and sex), weight and height (for calculation of body mass index), lipid profile and psoriasis severity (in terms of PASI) were traced. Only those cases having complete records regarding the requisite details were enrolled. A total of 60 such records were identified.

Assessment of Psoriasis Severity

Psoriasis severity was assessed by Psoriasis area severity index (PASI)⁶. PASI ranges from 0-72 and it is calculated using following method:

	Thickness 0-4	Scaling 0-4	Erythma 0-4	× Area 0-6 Total	TOTAL
Head	a	b	c	$d(a+b+c) \times 0.1$	A
Upper limbs	e	f	g	$h(e+f+g) \times 0.2$	B
Trunk	i	j	k	$l(i+j+k) \times 0.3$	C
Lower limbs	m	n	o	$p(m+n+o) \times 0.4$	D

$PASI = A + B + C + D$

Where, 0-4 scaling for severity of thickness, scaling and erythema is as follows:

- 0 = none;
- 1 = mild;
- 2 = moderate;
- 3 = severe
- 4 = Very severe

And, 0-6 grading of area is as follows:

- 0 = no involvement
- 1 = <10%
- 2 = <30%
- 3 = <50%
- 4 = <70%
- 5 = <90%
- 6 = <100%

Axillae = upper limb
Neck/buttocks = trunk
Genito-femoral = lower limb

Patients were classified as:

- Mild Psoriasis (PASI <5)
- Moderate Psoriasis (PASI 5-10)
- Severe Psoriasis (PASI >10)

Data Analysis

Data so collected was entered into computer. Data was analyzed using SPSS 21.0 software. Association between Psoriasis severity and lipid levels was analyzed using ANOVA. Correlation of PASI scores with lipid levels was established using Pearson's Bivariate correlation coefficient. A 'p' value less than 0.05 was taken as indicator of a significant association. For bivariate correlation, 'r' value >0.3 was considered to be clinically relevant (mild correlation).

RESULTS

Age of patients enrolled in the study ranged from 18 to 80 years. Mean age of patients was 39.37±16.53 years. Majority of patients were males (66.7%). The male-to-female ratio of study population was 2:1. Body mass index (BMI) of patients ranged from 20.1 to 34.4 kg/m². Mean BMI of patients was 26.88±3.38 kg/m². Total cholesterol (TC) levels ranged from 89 to 258 mg/dl. Triglyceride (TG) levels ranged from 61 to 453 mg/dl. Low density lipoprotein (LDL) levels ranged from 24 to 187.9 mg/dl while High density lipoprotein (HDL) levels ranged from 20 to 107 mg/dl. PASI scores ranged from 2.5 to 27.2. Mean total cholesterol, triglyceride; LDL and HDL levels were 151.42±39.29, 152.53±85.33, 77.36±34.24 and 43.58±16.33 mg/dl respectively (Table 1).

Table 1: General Characteristics and Lipid Profile of Psoriasis Patients

SN	Characteristics	Statistic
1.	Mean Age±SD (Range) years	39.37±16.53 (18-80)
2.	Male:Female	40 (66.7%):20 (33.3%)
3.	Mean BMI±SD (Range) kg/m ²	26.88±3.38 (20.1-34.4)
4.	Mean total cholesterol±SD (Range) mg/dl	151.42±39.29 (89-258)
5.	Mean triglyceride±SD (Range) mg/dl	152.53±85.33 (61-453)
6.	Mean Low Density Lipoprotein±SD (Range) mg/dl	77.36±34.24 (24-187.9)
7.	Mean High Density Lipoprotein±SD (Range) mg/dl	43.58±16.33 (20-107)
8.	Mean PASI±SD (Range)	8.52±4.09 (2.5-27.2)

As per PASI, a total of 9 (15%) had mild, 35 (58.3%) had moderate and 16 (26.7%) had severe psoriasis (Table 2).

Table 2: Distribution of Cases according to Severity of Psoriasis

SN	Severity	PASI Score range	No. of cases	Percentage
1.	Mild	<5	9	15.0
2.	Moderate	5-10	35	58.3
3.	Severe	>10	16	26.7

Mean total cholesterol levels were found to be 128.78±28.97, 146.63±35.98 and 174.63±41.86 mg/dl respective for mild, moderate and severe grades of psoriasis. Mean triglyceride levels were found to be 91.22±30.98, 140.20±60.22 and 214.00±115.16 mg/dl respectively for mild, moderate and severe psoriasis. Mean LDL levels were found to be 68.56±28.53, 77.48±31.52 and 82.04±43.08 mg/dl respectively for mild, moderate and severe psoriasis. Mean HDL levels were found to be 42.00±12.90, 41.17±13.87 and 49.75±21.66 respectively for mild, moderate and severe psoriasis. A continuous incremental trend of total cholesterol, triglyceride and low density lipoprotein levels was observed with increasing severity of psoriasis. High density lipoprotein levels of severe psoriasis patients were higher as compared to that of mild and moderate grade of psoriasis. However, a statistically significant association between psoriasis severity and lipid levels was observed for total cholesterol and triglycerides levels only (Table 3).

Table 3: Association between Psoriasis severity and Lipid Levels

SN	Lipid Parameter	Severity of Psoriasis			Statistical significance (ANOVA)
		Mild (n=9)	Moderate (n=35)	Severe (n=16)	
1.	Total cholesterol	128.78±28.97	146.63±35.98	174.63±41.86	F=5.192; p=0.008
2.	Triglyceride	91.22±30.98	140.20±60.22	214.00±115.16	F=8.604; p=0.001
3.	LDL	68.56±28.53	77.48±31.52	82.04±43.08	F=0.438; p=0.647
4.	HDL	42.00±12.90	41.17±13.87	49.75±21.66	F=1.596; p=0.212

On evaluating a bivariate correlation of lipid levels with psoriasis severity and area index (PASI) there was a positive significant correlation between PASI with total cholesterol (r=0.269; p=0.038) and between PASI and Triglyceride (r=0.368; p=0.004) (Table 4).

Table 4: Correlation between PASI and Lipid levels

SN	Parameter	'r'	'p'
1.	Total cholesterol	0.269	0.038
2.	Triglyceride	0.368	0.004
3.	LDL	0.043	0.747
4.	HDL	0.171	0.193

DISCUSSION

Lipid abnormalities have been stated to be quite common among psoriasis patients^{7, 8}. Dyslipidemia is recognized as one of the associated comorbidities in psoriasis patients⁹. In fact, lipid metabolism abnormalities have been supposed to play an important role in the etiopathogenesis of psoriasis. The development of psoriasis as a skin condition is often considered to be comparable to xanthomatosis, which is considered to be, caused by lipid abnormalities^{10,11,12}. Study of changes in composition of phospholipids in psoriatic plaque has revealed a link of inflammation, congestion, and parakeratosis to be a result of lipid deposition in the reticular-endothelial system¹³. The association has been evaluated in a number of case-control studies showing significantly raised lipid levels in psoriasis cases as compared to that of controls^{14,15,16}. Extending this relationship to the extent of disease, in present study we explored the relationship of psoriasis severity with lipid levels and found that except for HDL, all the lipids showed an incremental trend with increasing severity of psoriasis. As far as HDL levels are concerned, they reportedly, are found to be lowered in psoriasis patients as compared to controls^{15,16}. In present study, we found a random relationship of HDL levels with severity of psoriasis and found the mean levels of severe grade of psoriasis to be maximum followed by mild grade and moderate grade respectively, however, these random trends did not turn out to be statistically significant either. HDL levels are also known to be affected by gender. On evaluating our data we found that most of the patients in severe grades were males, and this could have been the reason for higher mean HDL levels in severe grade of psoriasis in our study. Considering the possible association of HDL with gender, this relationship might be skewed in case of a study population with different proportional representation of gender in different grades of psoriasis.

However, in present study, we found total cholesterol and triglyceride levels to be significantly associated with severity of psoriasis. Similar to present study, Ku *et al.*¹⁷ also found mean total cholesterol, triglyceride and LDL levels of moderate and severe psoriasis patients to be higher as compared to that of mild psoriasis but found the association to be significant statistically for triglyceride levels only. In another study, Gupta *et al.*¹⁸ kept control group as the reference group and significant differences between controls and mild psoriasis cases for total cholesterol and HDL levels and did not find it to be significant statistically for triglyceride and LDL levels, however, when they compared cases of moderate to severe psoriasis, they observed significant differences between cases and controls for all the lipid parameters. In present study, we also found that total cholesterol levels and triglyceride levels show a significant incremental trend with increasing severity, thus showing that lipid levels are not only involved in etiopathogenesis of psoriasis but are also related with its progression. A much stronger relationship between psoriasis severity and lipid levels was also observed by Srinivas *et al.*¹⁹ who observed significant incremental trends for all the lipids (TC, TG and LDL) with increasing psoriasis severity except for HDL for which they observed a significant decreasing trend with increasing psoriasis severity. However, in present study, we could find such trends only for total cholesterol and triglyceride levels only.

In present study we also found a weak positive and significant correlation between total cholesterol levels and PASI scores. A mild positive and significant correlation between triglyceride and PASI scores was also observed. As such we could not find strong correlation between lipid levels and PASI scores, thus showing that the psoriasis is a multifactorial problem which cannot be explained accurately only on the basis of changes in lipid levels. Other factors like insulin-resistance are also known to play a significant role in etiopathogenesis of psoriasis²⁰. Nevertheless, lipid levels seem to play a significant association with clinical manifestation of psoriasis as also proposed in some previous studies¹⁰⁻¹³. Further studies to explore a multifactorial relationship of psoriasis and its severity are recommended with inclusion of a control population and other metabolic factors that contribute to pathogenesis of psoriasis in a larger sample size.

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