

Dyslipidemia and Psoriasis: A Case Control Study

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ABSTRACT

Objective: To compare the mean values of lipid profile in psoriatic patients and healthy controls.

Study Design: Case control study.

Place and Duration of Study: Department of Dermatology, PNS Shifa, Karachi, from November 2012 to April 2013.

Methodology: Patients with psoriasis fulfilling the inclusion and exclusion criteria were selected from Dermatology Outpatient Department (OPD) of PNS Shifa, Karachi. After fasting for 14 hours, 5 ml of venous blood was drawn in sterile syringe and submitted to the Hospital Laboratory for lipid profile, by enzymatic method on Hitachi (Roshe®) using reagents by the same firm. The mean values lipid profile in psoriatic patients versus healthy controls were recorded and compared.

Results: A total of 256 patients (128 in each group) were enrolled. Mean lipid profile in both groups revealed cholesterol (mg/dl) value of 203.43 ± 11.43 in cases and 173.64 ± 13.65 in controls. Triglyceride (mg/dl) was 178.87 ± 43.60 and in cases 144.23 ± 34.01 in controls, HDL-C (mg/dl) was 37.81 ± 10.78 in cases and 41.41 ± 9.72 in controls while LDL-C (mg/dl) was 139.52 ± 13.71 in cases and 109.44 ± 13.80 in controls. Each parameters had p-value < 0.05 which was significant.

Conclusion: Dyslipidemia was found in a high percentage of psoriatic patients than healthy controls. Psoriatic patients require thorough lipid and cardiovascular examinations as they should be considered as individuals with increased risk of cardiovascular diseases.

Key Words: Dyslipidemia. Cholesterol. Triglycerides. LDL. HDL. Psoriasis.

INTRODUCTION

Psoriasis is a chronic inflammatory skin disease characterized by erythematous scaly plaques over extensor aspects of the body and scalp.¹ It affects 2 - 3% of world population.² The pathophysiology of psoriasis includes an increase in antigen presentation by dendritic cells, their presentation to T-cell with resultant T-cell activation and secretion of type 1 (TH1) cytokines by these cells.^{3,4} Psoriasis is considered as a systemic inflammatory disease causing various complications and co-morbidities which have significant impact on patients' health and quality of life.⁵ Early cardiovascular deaths have been reported in psoriatic patients as compared to general population.^{5,6} This may be related to the fact that the risk factors of cardiovascular disease and metabolic syndrome appear to be more common in patients with psoriasis compared with the general population which leads to accelerated atherosclerosis and coronary heart disease. These risk factors include obesity, smoking, diabetes mellitus, hypertension and dyslipidemia.⁶

Dyslipidemia is defined as an abnormal serum lipid profile.¹¹ Several studies have shown that psoriatic patients have proatherogenic lipid profile with raised

levels of S. triglycerides, total cholesterol including LDL and VLDL cholesterol and lower levels of cardio-protective HDL cholesterol.^{7,8} The data in Pakistani population is scarce. Only one study by Bajaj *et al.*⁸ has been done which reveals hyperlipidaemia in psoriatic patients.

The aim of present study was to measure the serum lipid profile of psoriatic patients and to compare the mean with the lipid profile of healthy controls after exclusion of other risk factors of hyperlipidaemia like increased BMI, smoking, hypertension, diabetes, alcoholics, hepatic or renal diseases and drugs causing hyperlipidaemia.

METHODOLOGY

This case-control study was conducted in Dermatology Outpatient Department of PNS Shifa, Karachi, after approval from ethical research committee of the hospital. Sample size was calculated with openEpi software. <http://www.openepi.com/SampleSize/SSPropor.htm> calculated with 95% confidence interval, 80% power of test taking mean HDL (mg/dl) 37.81 ± 10.78 in psoriatic patients and 41.41 ± 9.72 in controls.⁸ Two hundred and fifty patients (128 in each group) fulfilling the inclusion and exclusion criteria were selected after informed written consent and permission of the subjects to include their data in the study with the assurance of confidentiality of their demographic information. Patients were classified as mild (< 30% BSA), moderate (30 - 50% BSA) and severe (> 50% BSA) according to rule of nine. Mild to moderate cases of psoriasis on topical therapy only were included in study. The patients with severe

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psoriasis who were taking systemic therapy, BMI > 30 kg/m², smokers, alcoholic, with family history of hyperlipidaemia, hypothyroidism, cholestatic liver disease, chronic renal failure, and those taking medicine affecting lipid metabolism (lipid lowering agents, thiazide diuretic beta-blockers, retinoids, cyclosporine) and severe cases treated with systemic agents, pregnant and lactating patients were excluded from study. Controls were taken from patients attending skin OPD for other complaints like acne, melasma etc. which are not known to affect lipid levels and healthy staff members. After fasting of 14 hours, 5 ml of venous blood was drawn in sterile syringe and submitted to the hospital laboratory for lipid profile. These tests were done by enzymatic method on Hitachi (Roshe®) using reagents by the same firm. On the basis of laboratory reports the lipid profile in psoriatic versus healthy controls were recorded.

Data feeding and analysis was done on computer package SPSS version 11.0. Descriptive statistical analysis of continuous and categorical variables was performed. Data on continuous variables include age, duration of disease and mean lipid levels was presented as mean \pm SD and data on categorical variables include gender, family history, type of lesion was presented in number and percentages. Stratification was done with regards to age, gender and duration of disease to see the effect of outcome (hyperlipidaemia). Only p-value < 0.05 was considered as significant. Mean of lipid levels in psoriatic patients and healthy controls were compared by using student t-test.

RESULTS

A total of 256 patients (128 psoriatic patients and 128 healthy controls) were enrolled to compare their mean of lipid profile. Age distribution of the patients is shown in Table I.

Gender distribution of the patients and stratification of lipid profile for gender was done and mean lipid levels were compared which showed a significant difference in mean lipid profile of both groups (p-value < 5, Table II).

Fifty patients (39.06%) had 18-36 months duration of disease, 46.09% (n=59) had between 37 - 48 months while > 48 months of duration of disease was recorded in 14.84% (n=19) cases.

Table I: Age distribution of the subjects (n = 256).

Age (in years)	Cases (n=128)		Controls (n=128)	
	Number of patients	Percentage	Number of patients	Percentage
20 - 30	50	39.06	46	35.93
31 - 40	43	33.59	53	41.40
41 - 50	35	27.34	29	22.65
Total	128	100	128	100
Mean and SD	42.67 \pm 6.13		42.67 \pm 10.08	

Table II: Stratification of lipid profile for genders (n = 256).

Gender	Parameters	Diseased group	Controls	p-value
		Mean and SD	Mean and SD	
Male Female	Cholesterol (mg/dl)	218.51 \pm 18.32 210.11 \pm 15.01	181.41 \pm 11.24 163.26 \pm 17.65	0.00
	Triglyceride (mg/dl)	178.32 \pm 40.81 159.54 \pm 32.68	148.50 \pm 37.23 129.21 \pm 30.25	
Male Female	HDL-C (mg/dl)	35.29 \pm 9.48 33.38 \pm 8.44	38.32 \pm 9.37 42.78 \pm 6.32	0.01
	LDL-C (mg/dl)	146.76 \pm 8.54 147.91 \pm 11.97	118.02 \pm 14.81 115.80 \pm 16.14	

Table III: Mean lipid profile in psoriatic patients and controls (n = 256).

Parameters	Diseased group	Controls	p-value
	(n=128) Mean and SD	(n=128) Mean and SD	
Cholesterol (mg/dl)	203.43 \pm 11.43	173.64 \pm 13.65	0.001
Triglyceride (mg/dl)	178.87 \pm 43.60	144.23 \pm 34.01	0.001
HDL-C (mg/dl)	37.81 \pm 10.78	41.41 \pm 9.72	0.04
LDL-C (mg/dl)	139.52 \pm 13.71	109.44 \pm 13.80	0.01

Family history of the disease showed frequency of 5.4% (n=7) in cases and 3.1% (n=4) in controls while rest of 94.6% (n=121) in cases and 96.9% (n=124) in controls had no family history.

Majority (85.94%, n=110) had plaque type psoriasis, 7.9% (n=10) had scalp and nail involvement, while 2.3% (n=3) had guttate and palmoplantar variety and only 3% (n=4) had flexural psoriasis in diseased group of patients.

Mean total cholesterol (mg/dl), triglyceride (mg/dl), HDL-C (mg/dl) and LDL-C level in psoriatic patients and healthy controls, showed a significant difference (Table III).

DISCUSSION

Lipid metabolism research studies in psoriasis had been started at the beginning of the 20th century from the quantitative analysis of serum cholesterol in psoriatic patients.⁹ Psoriasis is now considered as immuno-metabolic syndrome.¹⁰ The abnormal fat metabolism was considered to be an important factor in the etiopathogenesis of psoriasis.¹¹ The pathophysiology of psoriasis includes activation of Th1 and Th17 helper T-cells with production of pro-inflammatory cytokines like TNF-alpha INF-gamma IL-1, IL-6, IL-8 and IL-17. These cytokines maintain a pro-inflammatory environment in psoriatic skin. These cytokines also cause obesity, insulin, resistance, dyslipidemia, endothelial dysfunction, increased oxidative stress and, therefore, are pro-atherogenic.¹¹

Therapy with retinoids and cyclosporine may also cause hyperlipidaemia in psoriatic patients.¹² Structural and

functional changes in gastrointestinal tract of psoriatic patients may lead to increased absorption of dietary lipids leading to hyperlipidaemia.¹³ Hyperlipidaemia along with other risk factors like diabetes mellitus, increased BMI, and smoking cause premature atherosclerosis which leads to increased cardiovascular morbidity and stroke in these patients.¹⁴ These lipid abnormalities seen in psoriasis might facilitate and maintain the inflammatory reaction in the skin. The level of antibodies against oxidized LDL is reported to correlate with disease severity.¹⁵ Therapy with statins may be beneficial to patients with psoriasis, as these reduce LDL oxidation and may even have immunomodulatory activities that may improve the psoriatic skin and cause a shift from pro-inflammatory to anti-inflammatory conditions in psoriasis.¹⁶ TNF- α inhibitor therapy is associated with beneficial effects on lipid profile.¹⁷ Therefore, psoriasis may be associated with hyperlipidaemia and hyperlipidaemia is associated with more severe psoriatic disease.¹⁶

Studies conducted so far on psoriatic patients have shown controversial results. Some studies show lipid levels to be significantly high.¹⁸⁻²⁰ while others found results to be insignificant by different.²¹⁻²³ In present study, we found that serum cholesterol, triglycerides, HDL-C and LDL-C levels were higher in psoriatic patients than healthy controls and p-value in each parameters was < 0.05 which showed a significant difference.

The mean lipid levels were also compared for both genders in psoriatic patients and healthy controls which showed that male patients had higher mean lipid levels than female patients and results were significant ($p < 0.05$). This might be due to the fact that only premenopausal patients less than 50 years were included in the study, therefore, excluding postmenopausal females who have higher cardiovascular risks owing to lack of cardio-protective effects of female hormones.²⁴ However, the mean lipid profile of female psoriatic patients was found to be significantly higher than female non-psoriatic controls.

The present study has potential limitations. Firstly, lipid levels were not available at the onset of disease so directionality of association could not be confirmed. Secondly, matching for age, sex and BMI could not be done which could have been a confounding variable. Relatively small number of patients may be another limitation. Lastly, case-control design of study would be better if a prospective cohort study had been applied.

Pro-atherogenic lipid profile along with other risk factors like increased BMI, obesity, smoking and hypertension increase the risk of premature atherosclerosis in psoriatic patients and increased risk of cardiovascular disease and stroke. Therefore, it is suggested that there should be routine monitoring of lipid profile in all psoriatic

patients. If they are found to have hyperlipidaemia, then an early intervention including dietary restriction, weight reduction measures and pharmacological treatment should be instituted.

CONCLUSION

Mean lipid profile was higher in psoriatic patients than in healthy controls.

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