

Original article:

Lipid alterations in psoriasis

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ABSTRACT:

INTRODUCTION: Psoriasis is an autoimmune disorder along multiple factors like systemic inflammation, oxidative stress, aberrant lipid profile which establish cardiovascular risk factor. Our aim was to see whether C-Reactive protein and lipid profile is altered in psoriasis and this is achieved by following objectives:-Estimation of serum total cholesterol, HDL, LDL, and Triglyceride, C-reactive protein levels of patients and control, Comparison of above parameters of patients with controls.

MATERIALS AND METHODOLOGY: The present study included forty patients of psoriasis and forty controls. Biochemical parameters including-Total cholesterol, HDL, LDL, Triglyceride, C-Reactive protein were estimated using the conventional methods.

RESULTS: Serum TC, TG, VLDL,TC/HDL, and C-Reactive protein were significantly higher in psoriasis patients compared to controls. Changes were observed in HDL and LDL levels but it was statistically insignificant.

CONCLUSION: Our data suggests that psoriasis patients must be considered as a group at high risk for cardiovascular disease since psoriasis per se seems to be associated with risk changes in lipid profile. We suggests early screening with serum lipid profile and in psoriatic patients at the time of presentation as well as follow-up for evaluating risk and treatment of hyperlipidemia to modify and prevent the progression to future cardiovascular diseases.

KEY WORDS: CRP-C-reactive protein, Hyperlipidemia

INTRODUCTION:

Psoriasis is one of the most common dermatologic diseases, affecting up to 1% of the world's population. According to World psoriasis day consortium about 125 million people all over the world suffer from this disease^[1]. In recent years, psoriasis has been recognized as a systemic disease associated with numerous multiorgan abnormalities and complication^[2]. Lipid abnormalities are detectable in psoriasis patients at the earliest stages of the disease and may therefore be genetically determined^[3]. Changes in the plasma lipid and lipoprotein composition in patients with psoriasis may be the reason for the increased risk of

atherosclerosis in this individuals^[4]. Almost half a century ago Lea, Cornish and Block reported increased serum lipid concentration in patients with psoriasis^[5]. Since then much research has been done in this field, most of which consistently points to a raised prevalence of lipid abnormalities in psoriasis. Alteration in plasma lipid and lipoprotein composition including a propensity towards an increase in total cholesterol (TC), Triglyceride (TG), low density lipoprotein (LDL), and decrease in high density lipoprotein (HDL) levels suggests psoriasis may be associated with disorders of lipid metabolism^[6].

As a classic acute phase reactant, CRP induces monocyte-macrophage exodus, expression of tissue factor with adhesion molecules and monocyte chemotactic protein-1^[7]. By all of these features, CRP is assumed to increase ischemic myocardial damage by participating in atherosclerotic pathogenesis. CRP testing is particularly important and it is also been proved to be risk predictor for the development of cardiovascular diseases^[7]. American Heart Association and Centre for Disease Control (CDC) reported that CRP is a risk marker for coronary artery disease^[8]. Hence, our study aimed to see whether lipid profile, uric acid level and C-reactive protein are altered in psoriasis and their possible usefulness as markers for risk factors of development of cardiovascular disease.

MATERIALS AND METHODS:

The study was conducted at Padmashree Dr.D.Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune-18. The study population was derived from the healthy ambulatory person in and around Pimpri area. The proposal of the study was put forth in the meeting of ethical committee of the institute and necessary permissions and clearance was obtained. The study group consisted of 40 psoriatic individuals of both the sexes. Aged between 40 yrs to 70yrs. Psoriasis of all types are included in the study. Exclusion Criteria were:- subjects not willing for consent, presence of any documented acute or chronic systemic illness, subjects on supplements or any medications specially lipid lowering agents were excluded from the study, smokers and alcoholics. The control group consisted of 40 healthy individual of comparable age and sex were included in the study. Subjects were excluded if they had any of the following conditions. All eligible patients selected for inclusion in the study were asked for a written informed consent in local language. Early

morning fasting blood samples. The samples were allowed to clot and were separated within 30-45 minutes of collection. Supernatant used after centrifugation and processed immediately on the same day.

METHODS:

Serum total cholesterol [TC]:- Enzymatic method – Cholesterol oxidase/peroxidase^[9].

Serum triglyceride [TG]:- Enzymatic method- Glycerol phosphate/peroxidase^[10].

Serum High-Density Lipo-protein-cholesterol [HDL]:-Direct detergent method^[11].

Serum Low density Lipoprotein [LDL]:-Direct detergent method^[12].

Serum C-reactive protein [CRP]:-Turbid metric method^[14]

STATISTICAL ANALYSIS:

Analysis of the data was done using the statistical methods such as determination of mean, standard deviation, p-value and Chi-square test.

RESULTS:

The study included forty patients of psoriasis and forty controls. Biochemical parameters including- Total cholesterol, HDL, LDL, Triglyceride, C - reactive protein was estimated using the conventional methods.

In this study we determined lipid profile, and C-reactive protein levels in 40 psoriatic subjects of 40-70yrs of age and compared them with 40 healthy subjects of the same age group.

Results showed that the TC was significantly raised ($p < 0.05$) in patients (196 ± 40.61 mg/dl) compared to controls (177.42 ± 34.59 mg/dl). There was significant increase ($p < 0.05$) in TG levels in patients (173.86 ± 79.22 mg/dl) compared to controls (124.1 ± 39.42 mg/dl).

We could not find any significant difference ($p = 0.22$) in HDL levels between psoriatic (43.38 ± 15.18 mg/dl) and control group (41 ± 6.9 mg/dl). As

for serum LDL values, we found it to be high in few of the psoriatic patients (117.87 ± 37.89 mg/dl) but the values were statistically insignificant ($p=0.062$) when compared to the controls (114.65 ± 26 mg/dl).

We also found serum very low density lipoprotein (VLDL) values in psoriatic patients (34.77 ± 15.84 mg/dl) were significantly higher ($p<0.05$) than the controls (24.82 ± 7.88 mg/dl). In our study, significantly raised ($p<0.05$) TC/HDL ratio (5.03 ± 1.78) was observed while LDL/HDL ratio was statistically insignificant (3.02 ± 1.33) when compared with controls (4.41 ± 0.99 and 2.86 ± 0.75) respectively.

Elevated levels of C-reactive protein were seen in psoriatic patients (6.8 ± 1.49 mg/l) compared to controls (3.08 ± 1.3 mg/l) and it was highly significant statistically with p values < 0.001 .

DISCUSSION :

Although there have been extensive studies of serum lipid levels in psoriasis, their importance in the etiology or in the enhancement of the disease remains controversial ^[15]. Genetic studies demonstrate that psoriasis and cardiovascular diseases share common pathogenic features, for example inflammatory cytokines like TNF- α and IL-1 play an important role. The chronic inflammation in psoriasis has an unfavorable effect on cardiovascular risk profile. Multiple cardiovascular risk factors seem to be influenced like, the blood pressure, oxidative stress, dyslipidemia, endothelial cell dysfunction and blood platelet adhesion ^[16].

In our study, we found significantly higher levels of TC values in the psoriatic patients ($p< 0.05$). This was in contention with the study of Javidi Z et al who in their study of 60 psoriatic patients found significantly higher TC, TG and LDL values in patients compared to controls. Among the many

studies on serum lipid values in psoriasis, conflicting results have been reported. In studies on serum TC levels in psoriatic patients, high ^[17], low ^[2], and normal ^[18] values have all been reported.

Seishima observed normal values for total cholesterol and HDL values in 38 psoriatic patients [19]. In a study by Mallbris et al., lipid contents of the HDL fraction were different between the cases and control group. The most important role of HDL particle is reverse cholesterol transport. In a study by Torkhovskaia on 192 psoriatic patients, high percentage of patients with hypo or hypercholesterolemia, low and high plasma HDL cholesterol levels was observed; depending on disease severity. Psoriasis patients had a big range not only in HDL₂ cholesterol, but also in HDL₃ cholesterol. They also had decreased CETP activity. Data obtained suggests the existence of changes in reverse cholesterol transport system in psoriasis, which may influence skin cell proliferation (via control of cell supply with cholesterol) ^[20].

We could not find any significant difference in HDL levels between psoriatic and control group ($p=0.22$). In several studies normal ^[6] and low ^[17] serum levels of HDL have been detected.

We found serum LDL values to be high in few of the psoriatic patients but the values were statistically insignificant ($p=0.062$) when compared to the control group. However As for serum LDL levels, high ^[21] or normal ^[2] values have also been reported in psoriasis.

We found serum VLDL values in psoriatic patients were significantly higher than the control group ($p<0.05$). In studies on serum VLDL levels in psoriatic patients, normal ^[21] and high ^[3] values have been reported. In our study, significantly raised TC/HDL ratio ($p<0.05$) was observed while

LDL/HDL ratio was statistically insignificant ($p=0.223$) when compared with control group.

CRP acts as an independent risk marker for cardiovascular disease (CVD). In addition to being a risk marker, there is much evidence suggesting that CRP may indeed be a culprit in atherogenesis. CRP has also been reported to stimulate tissue factor production by peripheral blood monocytes and could thereby have important pro-coagulant effects^[22].

Recent studies showed that psoriatic patients have increased CRP levels and it was also suggested that psoriasis is a systemic inflammatory disease preparing a convenient environment for cardiovascular diseases and co morbidities. In our study, an elevated level of CRP was seen and it was highly significant statistically with p values < 0.001 .

Furthermore, in agreement with previous findings suggesting of abnormal lipoprotein metabolism may be related to high incidence of atherosclerosis. Apoprotein C3 levels are suggested to inhibit lipoprotein lipases and hepatic triglyceride lipases, enzymes responsible for the clearance of triglyceride rich particles from plasma. In psoriasis increased levels of Apoprotein C3 induces development of hypertriglyceridemia. Apoprotein

E suggested being involved in the regulation of TG and LDL. The role of Apoprotein E gene in psoriasis was suggested because in psoriatic skin disease there is down regulation of Apoprotein E expression leading to increase TG and LDL levels. Hypertriglyceridemia secondary to VLDL elevation is associated with both pro-coagulant and pro-thrombotic factors in the blood and affects the adhesiveness of platelets. Resting platelets circulate freely, neither adhering to each other nor to other cells. However, activated platelets adhere to all lipoproteins, especially VLDL. VLDL-mediated platelet adhesion may play an important role in the progression of atherosclerosis. Furthermore, VLDL remnants are susceptible to retention within the arterial intima, thereby promoting atherosclerotic plaque growth^[3]. In light of these findings, the lipid abnormalities seen in psoriasis patients, while promoting atherosclerosis might in parallel facilitate and maintain the inflammatory reaction of the skin.

CONCLUSION:

Thus this study concludes that there are differences in lipid profile in psoriatic population as compared to healthy individuals due to altered homeostatic mechanisms.

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Table 1: Comparison of lipid profile and CRP levels between psoriasis cases and controls. Values are expressed as mean \pm SD

PARAMETERS	CONTROLS (n=40)	CASES (n=40)
Total cholesterol(mg/dl)	177.42 \pm 34.59	196 \pm 40.61*
Triglycerides(mg/dl)	124.1 \pm 39.42	173.86 \pm 79.22*
HDL(mg/dl)	41 \pm 6.9	43.38 \pm 15.18
LDL(mg/dl)	114.65 \pm 26	117.87 \pm 37.89
LDL/HDL	2.86 \pm 0.75	3.02 \pm 1.33
TC/HDL	4.41 \pm 0.99	5.03 \pm 1.78*
VLDL(mg/dl)	24.82 \pm 7.88	34.77 \pm 15.84*
C-reactive protein(mg/l)	3.08 \pm 1.3	6.8 \pm 1.49**

*p < 0.05 statistically significant

**p<0.001 highly significant

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Figure 1: Graphical representation of comparison of lipid profile and CRP among age-sex matched psoriasis cases and healthy controls.

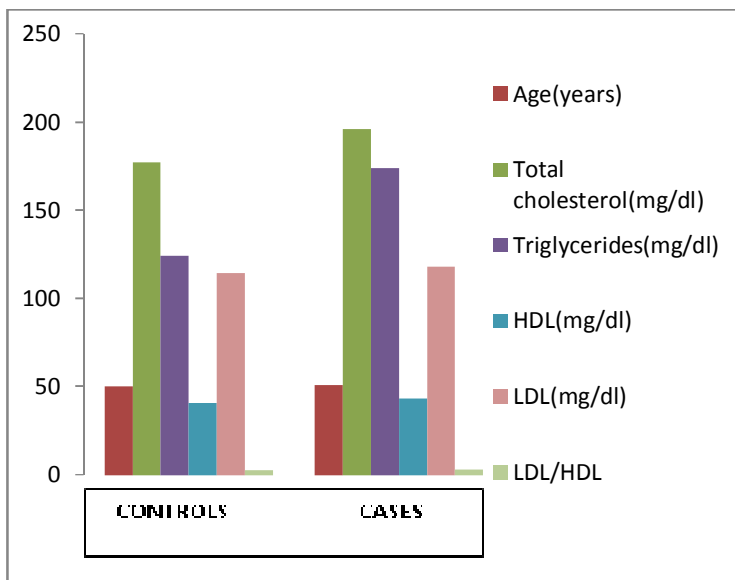
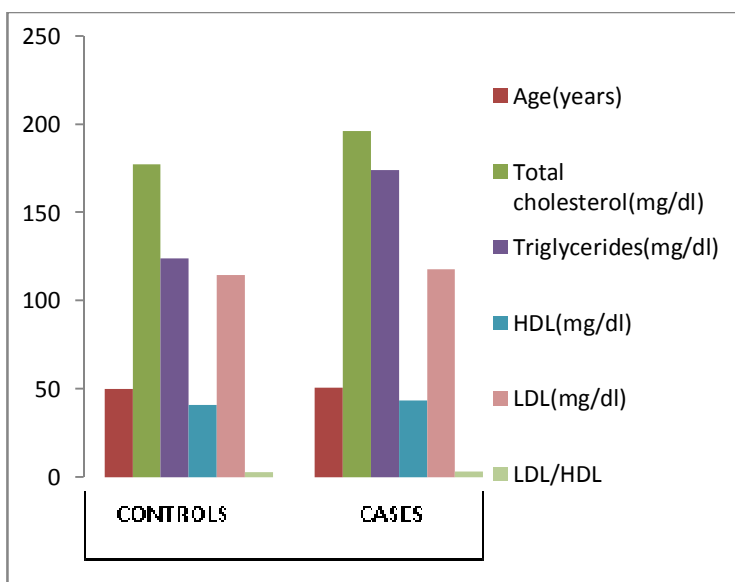


Figure 2: Graphical representation of LDL/HDL and TC/HDL ratio between psoriasis cases and controls showing increased risk of cardiovascular disease in cases.



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