

Research Article

Clinico-biochemical correlation between psoriasis and lipid profile

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ABSTRACT

Background: Psoriasis is an autoimmune disorder associated with alteration of different metabolism. The present study was aimed to assess the lipid metabolism and its correlation with severity of disease and associated cardiovascular risk factors in psoriasis.

Methods: Study comprises total of 60 cases of psoriasis attended the dermatology clinics at Maharaja Yashwant Rao hospital, Indore, Madhya Pradesh, India and 30 age, gender matched healthy controls. Subjects were enrolled in the study as per the inclusion criteria. Severity of the disease was assessed by PASI score. Fasting blood samples were collected and evaluated for Lipid profile and risk ratio was calculated.

Results: The results indicated that serum total cholesterol, triglycerides, LDL-C, VLDL-C were significantly increased in moderate to severe cases in comparison to control and level of HDL-C significantly decreased in moderate psoriasis and highly significant decreased was observed in severe cases when compared to control. Serum triglyceride (TG), total cholesterol, low density lipoprotein showed a significant positive correlation with severity of psoriasis. Study concludes that lipid derangement correlate with the severity of disease and also acts as a good prognostic sign.

Conclusions: Present study concludes that psoriatic patients should be evaluated and followed up for the risk of dyslipidemia and cardiovascular morbidity.

Key words: Psoriasis, PASI, Lipid profile, Dyslipidemia

INTRODUCTION

Psoriasis is an auto-immune disorder characterized by erythematous scaly plaques over extensor aspects of the body.¹ It affects about 2-3% of world's population. About 125 million people all over the world suffer from this disease.² Prevalence of the disease in India varies from 0.44% - 2.8%.

Patients with psoriasis appear to have an increased morbidity and mortality from cardiovascular events, especially those with a severe and long duration of psoriasis. There are several possible explanations for the increased prevalence of cardiovascular morbidity and mortality in patients with psoriasis. Multiple factors

including increased oxidative stress, decreased antioxidant capacity and other established risk factors such as hypertension, obesity and diabetes mellitus have been associated with psoriasis.³ However the pathogenesis of atherothrombotic events in psoriatic patients is yet to be identified.

Lipid metabolism may be playing a role in pathogenesis of psoriasis.^{4,5} Information is largely not available on lipid abnormalities in psoriatic patient. Lipid profile determines approximate risks for cardiovascular diseases.

Hence, present study is an attempt to assess the lipid abnormalities in the patients of psoriasis which are

independent risk factors for atherothrombotic events to occur. In the present study, we investigated the lipid profile in healthy control and in a group of psoriasis patients. In addition, we have evaluated the correlation between the lipid levels and severity of the psoriatic lesions by selecting psoriasis group with mild psoriasis and moderate/severe psoriasis and compared with the normal control group to look for increased risk of cardiovascular diseases.

METHODS

The present case control study was undertaken in the department of biochemistry and dermatology. 30 patients suffering from psoriasis attending the dermatology OPD in period between December 2014 to May 2015 age between 18-50 years not receiving any systemic treatment were selected as the case group. Age and sex matched 30 healthy volunteers were included in the study as control subjects.

The patients with secondary hyperlipidemia, on medication like corticosteroids, lipid lowering agents, antihypertensive, patients of psoriasis on treatment for more than one month and pregnant females were excluded from the study.

An informed verbal consent was taken by all the participants and the study protocol was approved by the local ethical & scientific committee.

Subjects were enrolled and relevant data collected from each of them in a preformed patient proforma. Cases were divided in two groups group A: with PASI score <10, group B: with PASI score >10. Severity of the disease was assessed by PASI score (psoriasis area severity index).

Collection and preparation of sample

5 ml of fasting venous blood with full aseptic precautions without anticoagulant was collected and allowed to clot. Clotted blood was centrifuged and clear serum was collected. Serum was analyzed in automated analyzer for total cholesterol (TC enzymatic CHOD-PAP), triglycerides (TG enzymatic GPO-PAP), HDL-C (precipitation method) and fasting blood sugar (FBS enzymatic (GOD-POD)). LDL-c was calculated by Friedewald formula and risk ratio was determined.

Statistical Analysis

Data were maintained on excel spread sheet. Analysis was performed using SPSS software. Descriptive data were expressed as mean, standard deviation, and range of all variables. Results were presented as mean±S.D. Means of data in patients and controls were compared using the independent student t-test. Differences were considered statistically significant at $p < 0.05$ and highly significant at $p < 0.001$.

RESULTS

In our study 17 patients were of moderate to severe psoriasis and 13 with mild psoriasis. Serum triglyceride (TG), total cholesterol, low density lipoprotein and VLDL were significantly ($p < 0.001$) higher in moderate to severe cases than in control.

Table 1: Basic characteristics of study population.

| Characteristics | Controls (n =25) | Cases (n =25) |
|-----------------|------------------|---------------|
| Age (yrs) | 34±9.14 | 36±6.13 |
| Male : Female | 16 : 14 | 17 : 13 |
| BMI (kg/m sq.) | 22.06±1.51 | 23.84±1.64 |

Table 2: Comparison of lipid profile between control and psoriasis patients.

| Parameters(mg/dl) | Controls | Psoriasis cases | p - value |
|-------------------|------------|-----------------|-----------|
| Total cholesterol | 172±26 | 229±40 | P<0.001 |
| Triglycerides | 97±21 | 159±38 | P<0.001 |
| LDL-c | 106±27 | 144±36 | P<0.001 |
| HDL-c | 45±12 | 33±10 | P<0.01 |
| VLDL-c | 17.89±5.68 | 23.76±7.94 | P<0.001 |
| TC/HDL-c | 3±0.6 | 4.7±1.80 | P<0.001 |

Table 3: Comparison of lipid profile between control and mild psoriasis patients.

| Parameters(mg/dl) | Controls | Mild psoriasis | p - value |
|-------------------|------------|----------------|-----------|
| Total cholesterol | 172±26 | 208±24.40 | P <0.01 |
| Triglycerides | 97±21 | 101±41.40 | P>0.05 |
| LDL-c | 106±27 | 114±32.20 | P>0.05 |
| HDL-c | 45±12 | 35±8.2 | P<0.02 |
| VLDL-c | 17.89±5.68 | 22.92±7.34 | P<0.01 |
| TC/HDL-c | 3±0.6 | 3.5±0.70 | P>0.05 |

Table 4: Comparison of lipid profile between control and moderate/severe psoriasis patients.

| Parameters(mg/dl) | Controls | Moderate / Severe psoriasis | p -value |
|-------------------|------------|-----------------------------|----------|
| Total cholesterol | 172±26 | 244±45.4 | P <0.001 |
| Triglycerides | 97±21 | 169±31.60 | P<0.001 |
| LDL-c | 106±27 | 164±49.2 | P<0.001 |
| HDL-c | 45±12 | 32±10.32 | P<0.001 |
| VLDL-c | 17.89±5.68 | 24.98±8.56 | P<0.001 |
| TC/HDL-c | 3±0.6 | 5.2±1.50 | P<0.001 |

Patients with mild psoriasis had elevated levels but not significant as compared to control ($p > 0.05$). HDL-C showed significantly ($p < 0.02$) lower value than control in mild cases and difference was highly significant ($p < 0.001$) in moderate to severe psoriasis. TC/HDL ratio were found to be significantly ($p < 0.01$) higher in cases than control group. Total cholesterol, LDL-cholesterol

and TG showed a significant $P < 0.001$ positive correlation with severity of the psoriasis.

DISCUSSION

Although there have been extensive studies in lipid metabolism in psoriasis, their importance in the etiology or in the enhancement of the disease remains conflicting. It is still controversial whether changes in lipid composition are primary events or secondary to psoriasis or perhaps due to medications, such as cyclosporine and retinoid.⁶⁻⁹

The association between psoriasis and dyslipidemia is somewhat controversial. We found a strong association as psoriatic patients had altered lipid levels, compared to the study of Cohen AD et al dyslipidemia was present in 50.9% patients. While in the study of Dreier J et al. dyslipidemia was found in 57.1% psoriatic patients. But in contrast, studies done by Neimann AL et al and Farshchian M et al failed to find a consistent association.¹⁰⁻¹³

Among many case-control studies on serum lipid levels in psoriasis, conflicting results have been reported regarding serum cholesterol, LDL-C, serum triglyceride and HDL-C levels. Total cholesterol and LDL-C levels in psoriatic patients were found to be either significantly higher or similar to controls.^{11,13-18} Triglyceride levels were reported to be significantly higher in psoriatic patients in some studies, but not in other studies.¹³⁻¹⁹ Finally, HDL-C levels had been found to be significantly lower, similar or even higher to controls.^{11,14-19} We found significantly raised levels of cholesterol, triglycerides and LDL-c in cases than in control group. Dyslipidemia was found more frequently in the patients with severe psoriasis. It was observed that in the patients with mild psoriasis i.e. PASI < 10, 3 (23%) had dyslipidemia as compared to the patients with severe psoriasis i.e. PASI > 10, 14 (83%) had dyslipidemia. Thus, frequency of dyslipidemia increased proportionately with the severity of disease. Javidi Z et al found that total cholesterol levels significantly increased with disease severity.¹⁶ LDL-C levels also increased but not significantly, while serum triglyceride and HDL had no relation with disease severity. Contrary to this, Mallbris L et al did not observe any significant association between disease severity and lipid profile.¹⁸

Several mechanisms for the increased lipid levels in psoriasis have been suggested. Psoriasis is now considered a systemic inflammatory disease, with Th-1 cells, Th-17 cells and inflammatory cytokines contributing to its pathogenesis.²⁰⁻²⁴ Furthermore, in agreement with previous findings suggesting of abnormal lipoprotein metabolism may be related to the high incidence of atherosclerosis in psoriasis. Hypertriglyceridemia secondary to VLDL is associated with both procoagulant and prothrombotic factors in the blood. VLDL mediated platelet adhesion may play an

important role in atherosclerosis. These VLDL remnants are susceptible to retention within the arterial intima, thereby promoting atherosclerotic plaques growth. In these regard, antibodies recognizing oxidized LDL is reported to correlate with disease severity.²⁵ Interestingly, macrophages activated by engulfing LDL immune complexes release large quantities of tumor necrosis factor (TNF- α) and IL-1 β .²⁶ Cytokine driven inflammation and tissue destruction is a common theme of chronic inflammatory disease. That is why, in psoriasis, the association between lipid and immunologic abnormalities was observed, so the disease could be described as an immunometabolic syndrome.^{27,28} Psoriasis is a chronic inflammation characterized by increased Th-1 and Th-17 T cell activity.²⁷ The significant role of cytokines, such as TNF- α , IL-6, IL-8, IFN-gamma, IL-1, and IL-17 in the generation of proatheromatous abnormalities (dyslipidemia, insulin resistance, endothelial dysfunction, clotting system activation and pro-oxidative stress) was reported.²⁷⁻³⁰

The clinical manifestations of both the diseases include inflammation that seems to be driven by certain T- cell cytokines including chemokines, local and systemic expression of adhesion molecules and endothelins which are characteristic for the T-helper 1 cell response.^{31,32} In light of these findings, the lipid abnormalities seen in psoriasis patients, while promoting atherosclerosis might in parallel facilitate and maintain the inflammatory reaction in the skin.

The present study has some potential limitations among them the small sample size because of our high standard strict exclusion criteria. Future studies with larger sample size having both sexes along with quantification of body fat content are needed to understand the role of lipids in pathogenesis of psoriasis.

CONCLUSION

Patients of psoriasis must be considered as a group at high risk for cardiovascular diseases. Lipid derangements correlate with the severity of disease and also act as a good prognostic sign. We suggest early screening with serum lipid profile assay in psoriatic patients at the time of presentation and follow-up for evaluating risk and treatment of hyperlipidemia to modify and prevent the risk of cardiovascular diseases.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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