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Evalution of Cardiovascular Risk in Psoriasis Patients

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ABSTRACT

Background-Psoriasis is a dermatological condition but its association with cardiovascular comorbidities is generating an increasing awareness that early diagnosis of associated cardiovascular risk factor like dyslipidemia can reduce morbidity, mortality and economic burden associated with the disease.

Aim- The purpose of this study was to determine the serum lipid disturbances in patients of psoriasis and to see whether this is related to the severity of the disease.

Setting and design- This was a case control study done in the department of Biochemistry, IGIMS, Patna, Bihar, India.

Material and methods-A total of 130 subjects were included in the study. Sixty five were newly diagnosed patients of psoriasis and sixty five were non psoriatic individuals of age group 15- 50years. Serum total cholesterol (TC), triglyceride (TG), high density lipoprotein cholesterol (HDL-C) and low density lipoprotein cholesterol (LDL-C) levels were estimated in both the groups. Psoriatic patients were divided into three groups as mild, moderate and severe based on PASI score. There were 22 patients of mild variety, 31 of moderate type and 12 of severe form.

Result- Serum total cholesterol (TC), triglyceride (TG), and low density lipoprotein cholesterol (LDL-C) levels were significantly raised in psoriatic group as compared to control group(p=0.01,0.04and 0.01 respectively). High density lipoprotein cholesterol (HDL-C) was decreased in psoriatic patients as compared to control but the decrease was not significant (p=0.32). ANOVA was calculated among the three groups of psoriatic patients with regard to TC, LDL-C and TG level. All three parameters showed positive correlation with severity but the increase with severity was significant only for LDL-C (p=0.004).

Conclusion –Serum Total cholesterol, LDL-C and TG were significantly raised in patients of psoriasis and also showed increasing pattern with severity. So patients of psoriasis must be screened for dyslipidemia to avoid cardiovascular complications.

KEYWORDS Psoriasis, Dyslipidemia, Lipid profile, PASI score.

INTRODUCTION:

Psoriasis is a non contagious auto-immune cutaneous disorder characterized by red and itchy skin with silvery white scales over extensor surface of the body [1]. 2-3% persons in the world are affected by psoriasis. About 125 million people all over the world suffer from this disease. This was the data given by the World Psoriasis Day Consortium [2]. It is characterized by excessive and rapid growth of epidermal layer of skin with epidermal hyperproliferation and inflammatory changes. It is concluded that environmental factors including β hemolytic streptococci infection and multiple genetic components may be responsible for the pathogenesis of the disease [3]. Histological examination of psoriatic lesion reveals leucocytes infiltration, namely by T lymphocytes and neutrophils [4].Various study done recently on psoriasis suggest that psoriasis like atherosclerosis and RA is an autoimmune disease. The pathophisiology of both diseases includes inflammation which appears to be mediated through Tcell cytokines characteristic of the T-helper cell response. The activation of the immune system in psoriasis cause changes in patient's lipid profile [5]. Changes in the lipid profile and lipoproteins especially an increase in total cholesterol (TC), Triglyceride (TG), low density lipoprotein (LDL-C), and decrease in high density lipoprotein (HDL-C) is one of the risk factor for cardiovascular events [6]. According to Melczer, there were changes in the composition of phospholipid in psoriatic patches. Also the parakeratosis and inflammatory lesion in psoriasis was due to lipid accumulation in reticular-endothelial system [7]. Continuous separation of silvery white scales of psoriatic lesion causes permanent loss of lipid which might disturb the normal lipid metabolism[7],[8].Psoriasis was originally thought of an inflammatory disorder solely affecting skin but is now recognized as a systemic inflammatory disease very much similar to systemic lupus erythromatosis(SLE) and Rheumatoid arthritis(RA)[9].Research suggest that patients with chronic inflammatory disease like SLE, RA and psoriasis are at increased risk of atherosclerosis and cardiovascular events[10],[11].

MATERIAL AND METHODS:

The present study was carried out in Department of Clinical Biochemistry, India Gandhi Institute of Medical Sciences, Patna, Bihar, India. Sixty five cases of psoriasis who attended the outpatient Department of Dermatology for the first time for this disease were taken as case. Psoriasis patients were grouped as mild, moderate and severe using Psoriasis Area Severity Index (PASI). A PASI score below 3 was "mild," between 3 and 10 was defined as "moderate," and above 10 is defined as "severe" disease (according to British Association of Dermatologists Guidelines) [12].Serum total cholesterol, triglycerides, low density lipoprotein, and high density lipoproteins was estimated in these patients.

Control group consists of age and sex matched sixty five healthy paramedical staff, volunteers and patients attending skin outpatient department for cosmetic problems like acne and melasma. Serum total cholesterol, triglycerides, low den-

sity lipoprotein, and high density lipoprotein was estimated in these subjects also.

Inclusion criteria- Newly diagnosed patients of psoriasis with all its clinical forms were included in study. Subjects of age group ranging from 15-50years were included in the study for both the groups.

Exclusion criteria- Patients with diabetes, hypertension, obesity, family history of hyperlipidemia, hepatic and renal failure, endocrine disorders, taking drugs especially statins, pregnant and lactating patients will be excluded from the study in both case and control groups.

The study was approved from ethical research committee of the hospital. The purpose of the study was explained, and informed consent was obtained from all respondents.

5 ml of venous blood was collected in plain sterile tube after 14 hours fasting. Blood was kept aside for clot formation and then centrifuged at 2500 r.p.m. for 15 minutes within 30 minutes of sample collection.

Serum TC, TG, LDL-C, & HDL-C were estimated in both groups, on fully automated autoanalyser AU 400.

Serum total cholesterol was measured by enzymatic end point cholesterol oxidase method. Serum total triglycerides (TGs) were estimated using enzymatic method—glycerol phosphate oxidase: peroxidase (GPO: PAP) method. High density lipoprotein (HDL) was measured using direct method.

Serum low density lipoprotein (LDL) was estimated using Friedwald's formula [13]:

LDL-C=Total cholesterol β (HDL-C + TG/5)

TG/5 = VLDL (very low density lipoprotein).

The lipid profile values were considered to be deranged when the total cholesterol was ≥ 200 mg/dl, the triglycerides were ≥ 150 mg/dl, HDL cholesterol was ≤ 35 mg/dl and LDL cholesterol was ≥ 130 mg/dl.

The internal and external quality control was performed so as to obtain an accurate value of the study samples. The serum samples were repeatedly assessed to confirm the value obtained.

STATISTICAL ANALYSIS:
Statistical analysis was performed using Graph pad Prism (version 5.0). Data obtained were presented as mean ± SD. One way analysis of variance (ANOVA) was applied to the result data of different groups of psoriasis patients. Results of the study were discussed at 95% confidence interval. Interpretation of the test results was done according to p value. ($p < 0.05$ is significant and $p \geq 0.05$ is not significant).

RESULT:
The study included 65 psoriatic patients and 65 normal control subjects. Psoriatic group had 35 male and 30 female patients. Control group had 39 male and 26 female applicants.

The age of participants in both group ranged from 15 to 50 years. The mean age of psoriatic patients ranged from 29.95±10.60 and that of control group was 30.30±10.13. There was no statistical difference in age between psoriasis and control group (p=0.84).

Total cholesterol and LDL-C were significantly raised in psoriatic group as compared to control group with p=0.01 for both. Serum triglyceride was also significantly raised in psoriatic group as compared to control group with p=0.04.Serum HDL-C was decreased in psoriatic group as compared to control but the decrease was not significant (p=0.32) (Table1).

Psoriasis patients were grouped as mild, moderate and severe using Psoriasis Area Severity Index (PASI). Psoriasis Area and Severity Index (PASI) is the most widely used tool for the measurement of severity of psoriasis. PASI score assess the severity of lesion together with the area involved and gives value ranging from 0 (no disease) to 72 (maximal disease) [14]. A PASI score below 3 is "mild," between 3 and 10 was defined as "moderate," and above 10 is defined as "severe" disease (according to British Association of Dermatologists Guidelines) [12].The grading of the patients was done by the help of a dermatologist. Out of 65 psoriatic patients, 22 were of mild form, 31 of moderate form and 12 of severe psoriasis. Mean value of serum TC, LDL-C and TG seems to rise with increase in severity of psoriasis. Values of lipid parameters among these groups were compared by one way analysis of variance (ANOVA).The increase in LDL-C with severity was statistically significant with p = 0.004.Though total cholesterol and TG also seems to rise with severity but the increase was not significant with p value of 0.80 and 0.12 respectively (Table 2).

DISCUSSION:
Psoriasis is now considered as immunometabolic syndrome and is more than skin deep [15][16]. It has often been seen to be associated with various comorbidities that increase the risk of cardiovascular disease and metabolic syndrome in psoriasis patients [16].

In psoriasis there is activation of Th1 and Th17 helper T cell along with production of TNF β and INFβ,IL1,IL6,IL8,IL12,IL15, IL18[17].The same factors are also implicated in the pathogenesis of its comorbidities[17].

Evidence suggest that death due to cardiovascular disease(CVD) is early in psoriatic patients as compared to general population as risk factors of CVD is more common in patients of psoriasis than others that leads to more rapid advancement of atherosclerosis and coronary artery disease in these patients[18][19].

So lipid profile has been considered as an efficient biomarker for the screening of these psoriatic patients for the presence of these comorbidities [20].

Various studies have been conducted to show the association between lipid profile and psoriasis patients all with contradictory results.

Some has reported raised values, some lower values and some normal lipid values in psoriatic patients. In our study we have observed significantly higher values of serum total cholesterol, serum triglycerides, low-density lipoprotein-cholesterol (LDL-C) in psoriatic patients as compared to control subjects. High-density lipoprotein-cholesterol (HDL-C) level was lower in psoriatic patients as compared to control subjects but the decrease was not significant.

Mehdi Taheri Sarvtin et al. [21] and Rabia Ghafoor1 et al.[22] has also reported similar result of raised serum total cholesterol , TG, LDL,VLDL and decreased serum HDL level in psoriatic patients as compared to control subjects.

Our study also matched with Mohamed Amer et al. who has also reported raised serum total cholesterol, TG, LDL and decreased serum HDL level in psoriatic patients .This study also showed increase in the level of serum TC, LDL-C and TG with increase in severity of psoriasis which matched with our study [23].

Y. C. Nakhwa et al. [24] has reported increased mean HDL-cholesterol levels in psoriatic patient as compared to control which was not consistent with our finding.

Chetana Shenoy [25] has reported significantly increased serum triglycerides in the psoriasis group than in the control group. No significant difference was found between serum total cholesterol, low-density lipoprotein-cholesterol (LDL-C),

high-density lipoprotein-cholesterol (HDL-C) levels in the two groups. However, significantly elevated LDL-C was reported in severe psoriasis as was seen in ours.

Cardiovascular events occur more frequently in psoriasis patients with severe pattern of disease [26].Considering this variation of lipid profile with severity of psoriasis; we evaluated lipid profile parameters in mild, moderate and severe psoriasis. Grading of mild moderate and severe psoriasis was based on PASI score.

When lipid profile was compared between various groups based on severity, we observed that serum TC, TG, LDL-C, level increases with increases in severity. The increase in values with severity was statistically significant only for LDL –C.

Raised level of LDL-C and decreased HDL-C as seen in this study is a well established risk factor for the development and aggressive progression of atherosclerosis leading to various cardiovascular complication [27].

Pathogenesis of psoriasis involves activation of T lymphocytes with unknown antigen or gene together with interaction between keratinocytes and complex cytokines [28] [29].

Growth factors from various cell types are believed to be responsible for decrease in maturation and shedding time of keratinocytes from normal 26 days to 4 days in patients of psoriasis [30].

Immunological disturbances and proinflammatory cytokines play a significant role in pathogenesis of both atherosclerosis and psoriasis. They both show common features of T cell, monocytes, neutrophils and mast cell infiltration histologically [31].Basically TNFα in addition to various other cytokines and growth factor may be a connecting link between psoriasis and cardiovascular disease [32].

LIMITATIONS:

The major limitation of this study was lesser sample size.

CONCLUSION:

Our study suggest that early screening for lipid disturbances must be done in all psoriatic patients attending the dermatology department for the first time and in follow up, so that treatment must be started not only for psoriasis but also for dyslipidemia to prevent atherosclerosis and cardiovascular complication in psoriatic patients.

TABLES:

Lipid profile parameters	Patients (n=65)	Control(n=65)	P
Total cholesterol (mg/dl)	200.36±49.52	182.48±33.00	0.01
Triglyceride (mg/dl)	171.62±84.88	144.83±68.10	0.04
LDL (mg/dl)	117.88±43.42	100.59±31.00	0.01
HDL(mg/dl)	49.42±10.45	51.21±10.07	0.32

[Table/fig- 1]: Lipid profile of patients and control group

Lipid profile Parameter	Psoriasis patients(n=65)			F	P value	
	Mild(n=22)	Moderate(n=31)	Severe(n=12)			
Total cholesterol	195.46±37.85	201.30±63.50	206.89±20.89	0.21	0.80	
Triglyceride	140.63±26.41	184.59±109.47	189.45±70.83	2.17	0.12	
Low density lipoprotein	103.92±15.04	129.82±11.33	153.15±15.82	5.93	0.004	

[Table/fig-2]: ANOVA among mild, moderate and severe group in psoriasis patients

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