Original Article

Role of Oxidative Stress in Various Stages of Psoriatic Patients

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ABSTRACT

OBJECTIVE: To Assess the Role of Antioxidant, Lipid Peroxidation Status and Lipid Profile in various stages of Psoriasis Patients.

METHODOLOGY: The present study was a Case Control. It was carried out in the Department of Biochemistry, at Basic Medical Sciences Institute (BMSI) Jinnah Post Graduate Medical Centre from April - December 2015. One hundred and twenty cases of psoriasis patients grouped as Mild, Moderate, Severe and Forty healthy control for comparison was included in the study.

Lipid Profile including serum total cholesterol, Triglyceride (TG), - high density lipoproteins (HDL) and low- density lipoproteins (LDL), were estimated by enzymatic colorimetric Method on Micro lab 300 (Merck & Germany) and Antioxidant status like Superoxide Dismutase (SOD) and Lipid Peroxidation status like Malondialdehyde (MDA) were measured by ELISA. The statistical analysis was performed by SPSS software Version 16. P value less than 0.005 was considered significant.

RESULTS: Our result showed significantly increase in the mean serum level of triglycerides (TG), Total Cholesterol and low density lipoproteins in psoriatic patients when compared to control where as high density Lipoproteins was significantly decline in psoriatic groups when compared to control while SOD level was reduced in psoriasis patients as compared to control. The MDA level was raised in psoriasis patients as compared to control.

CONCLUSION: The finding of our study support the hypothesis that imbalance in oxidant-antioxidant system play role in the etiology of psoriasis. Also dyslipidemia was observed risk factor for development of cardiovascular diseases.

KEYWORDS: Oxidative Stress, Psoriasis

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INTRODUCTION

Psoriasis is an irregular, immune related, provocative skin disease. It is non-contagious leading to a socioeconomic burden on the health system, which is characterized by red patchy having lesions among grey, silvery whitish lines. The lines were classically dispersed on elbows, scalp, knees, nails, joints other part of the body that may be often painful and pruritic when severe[1].

Skin cells become shed off replaced by new cells. But in psoriasis, Skin cells production become more than normal[2]. Types of psoriasis i.e psoriasis vulgaris, guttate psoriasis, erythrodermic psoriasis, pustural psoriasis and psoriatic arthropathy[3].

Psoriasis affects about 2% population of world. According to world day association about 125 million peoples all over the world suffer from this disease[4], about one and half lack fresh psoriatic cases report annually. U.S.A. 4.6% population affected lower prevalence reported in Indians (0.7%). High prevalence rates have been reported in Kazakhstan[5].

It is an idiopathic disease that can occur due to abnormalities in essential fatty acid metabolism[1], lymphokine secretion, and oxygen related stress.[6]It has been proposed in recent research that Increased reactive oxygen species (ROS) generation and decreased function of antioxidant system might be responsible for pathological process. Dyslipidemia are observed in early stages of the disease psoriasis patients and thus may be congenitally determined.

Psoriasis is a multifactorial illness, influenced by both genetic and environmental factors. Multiple factors including atypical lipid profiles, rise oxidative stress, decline antioxidant capacity and risk factors like hypertension, obesity, diabetes mellitus have been associated with it[7]. Chronic inflammation, a characteristic feature of psoriasis may play a role in the initiation and progress of dyslipidemia[8]. Increased ROS production during inflammatory process in psoriasis causes reduction of antioxidant mechanisms and lipid peroxidation[9].

As, Psoriasis patients present with an abnormal lipid profile, depletion of antioxidants defenses and lipid peroxidation that promote atherogenesis. Hence this study intends to evaluate serum lipid profile, Antioxidant and Lipid peroxidation status in Psoriasis patients.

METHODOLOGY

The present research was case control study, carried

out in the Department of Biochemistry, at Basic Medical Sciences Institute (BMSI) Jinnah Post Graduate Medical Centre (J.P.M.C.) from April - December 2015. Endorsement was taken from Ethical Committee of BMSI, JPMC Karachi.

Informed compliance was taken from individuals taking part in research. Proposed performa was used to collect the base line data Including age, sex, gender, ethnicity, Detailed medical history and appropriate investigations were included as part of the methodology. Healthy individuals were taken as control for comparison.

Diagnosed psoriatic patients were taken and included from Department of Dermatology JPMC Karachi. Alcoholics, Smokers, Hypothyroid, patient of liver, kidney and skin diseases were excluded from the study.

Biochemical investigations Like Lipid study including serum Total cholesterol, Triglycerides, High density lipoprotein, Low density lipoprotein was determined by enzymatic colorimetric method on Micro Lab 300. Antioxidant Status like SOD and Lipid Peroxidation status like MDA assay were carried out by ELISA method.

Non probability purposive sampling technique were used in this study. The blood samples of the subjects who fulfill the criteria were collected after an overnight fasting (10-12) hours. Strictly pre-defined protocol was used for samples collection storage and analysis.

Statistical analysis was carried out by SPSS software Version 16. The results of lipid tests, Antioxidant and Lipid Peroxidation status markers were expressed in Mean± standard deviation. The collected data were scrutinized with student's t-test to evaluate the difference between the patient and control groups. P values<0.05 were considered statistically significant.

RESULTS

COMPARISON OF BIOCHEMICAL VARIABLES AMONG THE STUDY & CONTROL GROUPS

Statistically significant decrease in mean serum SOD level was found in moderate and severe psoriatic groups when compared to control (P value = 0.004). Statistically significant increase in mean serum MDA levels was found in mild, moderate and severe disease groups in contrast to control (P value = 0.01). Table I.

COMPARISON OF LIPID PROFILE AMONG THE STUDY & CONTROL GROUPS

The mean cholesterol level of severe group was significantly increased when tally to control, mild and moderate groups (P value =0.01). The mean triglycerides was remarkably rise in severe group when correlate to control, mild and moderate groups (P value =0.01). The mean HDL-C was notably decline in severe group when analogized to control, mild and moderate groups (P value =0.005). The mean LDL-C was significantly increased in severe group when match up to control, mild and moderate groups (P value =0.005). Table II.

TABLE I: COMPARISON OF BIOCHEMICAL VARIABLES AMONG THE STUDY & CONTROL GROUPS

Variable	Control (n=40)	Mild, (n=40)	Moderate (n=40)	Severe (n=40)
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Serum SOD (U/L)	109.2±32.7	92.4±31.7	89.5±25*	84.8±35.6*
Serum MDA (nmol/ml)	10.6±2.8	11.3±2.3	13.3±2.8	29.8±14.4*□Δ

* Statistically significant as compared to controls p<0.05
□ Statistically significant as compared to Mild, Psoriasis p<0.05
Δ Statistically significant as compared Moderate Psoriasis p<0.05
☼ Statistically significant as compared to Severe Psoriasis p<0.05

TABLE II: COMPARISON OF LIPID PROFILE AMONG THE STUDY & CONTROL GROUPS

Variable	Control (n=40)	Mild, (n=40)	Moderate (n=40)	Severe (n=40)
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Cholesterol	147.5±27.7	151.5±36	193±42.7	235.1±35*□Δ
Triglyceride	104.4±25	129±19.8	136.8±29.1	160.1±25.6*□Δ
HDL-C	36.3±4.8	32±8.5	26.6±15.8	21.7±5.9 *□
LDL-C	91.4±30.4	99.7±28.9	104.2±30.4	124±33*□Δ

* Statistically significant as compared to Controls p<0.05
□ Statistically significant as compared to Mild, p<0.05
Δ Statistically significant as compared to Moderate p<0.05
☼ Statistically significant as compared to Severe p<0.05

DISCUSSION

In the present study we found consequential rise in mean serum MDA levels in psoriatic cases when compared to control group ($p < 0.05$), support the previous finding and indicated that lipid peroxidation have role in pathogenesis of psoriasis. This trend of increase serum MDA level in psoriatic patients was reported by Nast A 2015[6]

The present research point out a strong association between MDA levels and progression of disease. The possible philosophy behind rise of MDA level in oxidative stress might be due to the fact that ROS increase activity of Phospholipase A2 causes peroxidation of Arachidonic acid with the help of many mediators and finally resulted production of MDA. In difference to our study, Augustin M 2008[20] reported that no remarkable dissimilarity in serum MDA level between psoriatic cases and control group.

Our study showed that mean SOD level were significant decreased in psoriatic patients in contrast to control group (P <0.05). our results are in accordance with previous studies Abdel-Mawla MY 2013[12].

Our study showed that low levels of antioxidant that is SOD was found in psoriasis especially in severe group. The mechanism behind this low level of SOD is its utilization for the reduction of inflammatory products. In difference to our study another study[14] found no significant difference in serum SOD level between psoriatic cases vs control.

In this study we also evaluated Lipid Profile and found significant increase in mean total cholesterol, level in psoriasis groups when compared to control ($p < 0.05$). Similar result was reported by Latha KP 2014[13] and Bhatia K 2014[19]. In difference to present study another found no significant difference in total cholesterol between psoriatic cases and control[17]. We found significant increase in mean triglyceride level in psoriatic groups when compared to control ($p < 0.05$). Similar finding were reported by Ghafoor R 2015[17]. In difference to our study Arora M 2015[21] found no significant difference in Triglyceride levels between psoriatic and control groups. Our study showed significant decrease in mean HDL levels in psoriatic groups when compares to control ($p < 0.05$). Same result was reported by Augstin M 2008[20] and Arora M 2015[21].

In difference to our study found no significant difference in mean HDL levels between psoriatic and control groups. Hilda Dsouza P 2013[18] also reported no significant difference in HDL between psoriatic and control groups.

Our study showed significant increase in mean, LDL level in psoriatic groups when compared to control ($p < 0.05$). Similar findings had been reported by Arora M 2015[21], and Bhatia K 2014[19]. In difference to our study Latha KP 2014[13] found no significant difference in LDL between psoriatic and control groups.

CONCLUSION

In Conclusion, our results showed that imbalance in oxidant/antioxidant might be intricated in the pathological process of psioriasis. In addition our study like previous research shows that hyperlipidemia is remarkably more common in psoriasis patients. Both of these factors leads to development of atherosclerosis and its complications. It is therefore suggested to do early preliminary determination and treatment of hyperlipidemia to avoid, diabetes mellitus, cardiovascular events and its complications. Further more, Antioxidant supplementation is recommended to inactivate free radicals and avoid further new epidermal destruction.

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AUTHOR CONTRIBUTIONS

Khan F: Hypothesis designing, Focal to conduct research, Data collection & compilation
Akram M: Article arrangement & finalization
Rehman A: References collection
Mehreen : References collection
Jahanzaib: Manuscript review & finalization
Naeem SM: Tabulation & graph formatting

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