Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL 13, ISSUE 05, 2022

To Evaluate And Compare Of Lipid Profile And Blood Sugar Level In Psoriasis Patients: A Case-Control Study

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Abstract:

Introduction: Psoriasis is one of the most common chronic inflammatory skin diseases in humans, mediated by cells and molecules of both the innate and the adaptive immune system. All dermal and epidermal elements guaranteeing barrier integrity under physiological conditions are deregulated in psoriasis, thereby leading to the development of a chronic skin inflammation.

Materials and Methods: This is a case-control study conducted at Department of Biochemistry, Central Research Lab and Central Clinical Lab of GMC Azamgarh. The subjects will be selected as per the inclusion/ exclusion criteria. A detailed clinical history including age, sex, and occupation will be collected from the patients after obtaining written and informed consent. They are divided into 2 group Case: Psoriasis patients and Control: Apparently Healthy Individuals

Result: Cholesterol level in case group 213.47±23.31 and control group 185.23±17.42 which is statistically significant (0.001). Triacylglycerol value in case group 172.05±18.83 and control group 126.83±13.21 which is statistically significant (0.001). HDL level in case group 43.34±6.91 and control group 45.48±5.20 which is statistically significant (0.001). LDL in case group 135.73±12.64 and control group 114.39±5.07 which is statistically significant (0.001). VLDL in case group 34.4±3.76 and control group 25.36±7.21 which is statistically significant (0.001).

Conclusion: In conclusion, lipid metabolism abnormalities and oxidative stress are common among patients with psoriasis and PSA. Every patient should be evaluated to determine total CV risk for the purpose of ensuring appropriate patient education and making decisions on

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the intensity of treatment. Effective treatment of patients with psoriasis or PSA could reduce the risk of cardiovascular diseases.

Keywords: Lipid profile, Blood Glucose, Psoriasis patient

Introduction:

Psoriasis is one of the most common chronic inflammatory skin diseases in humans, mediated by cells and molecules of both the innate and the adaptive immune system. [1] All dermal and epidermal elements guaranteeing barrier integrity under physiological conditions are deregulated in psoriasis, thereby leading to the development of a chronic skin inflammation. [2] Since its pathology fits the definition of "a clinical syndrome caused by activation of T cells and B cells, or both, in the absence of an ongoing infection or other discernable causes" psoriasis is ranked among autoimmune diseases. [3]

Psoriasis involves the skin and nails, and is associated with a number of comorbidities. Skin lesions are localized or generalized, mostly symmetrical, sharply demarcated, red papules and plaques, and usually covered with white or silver scales. Lesions cause itching, stinging and pain. [4] Between 1.3% and 34.7% of individuals with psoriasis develop chronic, inflammatory arthritis (psoriatic arthritis) that leads to joint deformations and disability. Between 4.2% and 69% of all patients suffering from psoriasis develop nail changes. [5] Individuals with psoriasis are reported to be at increased risk of developing other serious clinical conditions such as cardiovascular and other noncommunicable diseases (NCDs). [6]

The causes of psoriasis are not fully understood, but a number of risk factors are recognized, including family history and environmental risk factors, such as smoking, stress, obesity, and high alcohol consumption. [7] Patients suffering from psoriasis are stigmatized to such an extent that it causes a considerable psychosocial disability and has a major impact on the Quality of Life (QoL). [8]

Psoriasis patients must be considered as a group at risk for cardiovascular disease and that risk seems to be higher in severe psoriasis. Primary biliary cirrhosis is also strongly associated with psoriasis. [9] High LDL and/or low HDL levels, risk factors for atherosclerosis, are also a common clinical feature in psoriasis. Adjustment for established environmental risk factors did not aVect cholesterol and lipoprotein concentrations. [10] Auto antibodies recognizing oxidized LDL are detected not only in atherosclerosis but also in systemic lupus erythematosus, rheumatoid arthritis and psoriasis. [1]

The spectrum of DM is due to a common denominator, the defective beta cell. This core defect results from four basic pathophysiologic processes comprising genes and epigenetic changes, inflammation, environment, and insulin resistance. [12] As a result, hyperglycemia arises through multiple pathways, the so-called Egregious Eleven. [13] The beta-cell dysfunction and related mechanisms of hyperglycemia and resultant endogenous fuel excess

ISSN: 0975-3583, 0976-2833 VOL 13, ISSUE 05, 2022

cause oxidative stress and epigenetic changes in tissues throughout the body, including worsening beta-cell dysfunction. [14]

MATERIALS AND METHODS:

This is a case-control study conducted at Department of Biochemistry, Central Research Lab and Central Clinical Lab of GMC Azamgarh.

The subjects will be selected as per the inclusion/ exclusion criteria. A detailed clinical history including age, sex, and occupation will be collected from the patients after obtaining written and informed consent.

Selection of cases :
Inclusion criteria-
1- Psoriasis patients of age group of 18-60years.
2- All patients must be diagnosed for Psoriasis.
3- Subject who will sign the consent form.

Exclusion criteria- :
1- History of Diabetes mellitus and other endocrine Disorders
2- History of Hypertension, Renal disorders, Coronary artery disease.

They are divided into 2 group Case: Psoriasis patients and Control: Apparently Healthy Individuals

Selection of control :
Apparently healthy individuals will be taken as control (age-group: 18-60 years).
Excluded if they had any history of autoimmune disorders.

Laboratory Investigation
Blood samples were collected by vein puncture under all aseptic precautions from subjects using disposable syringes in fasting condition and Post Meal were collected in tubes containing Sodium fluoride as an anticoagulant.

Lipid Parameters
Total cholesterol, LDL cholesterol, HDL cholesterol, Triglyceride, VLDL cholesterol. Biochemical assays: All biochemical assays were carried out with Automated Random access clinical chemistry analyzer ERBA Chem 7 with ERBA TEST REAGENT (Transasia Bio-medicals Ltd., India). LDL and VLDL were calculated from the estimated values of Cholesterol, Triglyceride and HDL-C, using the equation of Frieldwald et al as given below. [LDL- Cholesterol] = [Total Cholesterol] – [HDL-C] – Triglyceride/5. All the concentrations are given in mg/dL. The factor [Triglyceride], is an estimation of 5.

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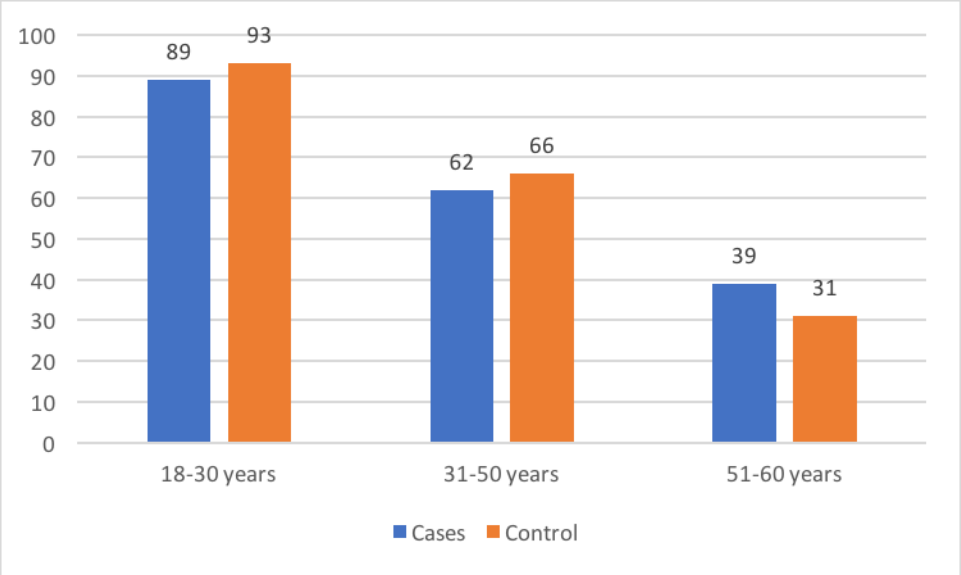
Statistical Analysis

Statistical analysis will be conducted by using SPSS version 20.0 (Chicago, US). Mean ± SD (Standard Deviation) of all quantitative clinical parameters will be calculated in patients of psoriasis and healthy controls. Appropriate statistical test will be used to calculate significance (p value) in between the groups. Correlation will be determined by using Pearsons correlation coefficient. The differences in genotype and allele frequencies between patients and controls analyze by fischer's exact test using SPSS software. $p<0.05$ value will be considered statistically significant.

Result

A total of 380 patients who fulfilled the selection criteria during the study were enrolled, they were divided into two groups case and control each group consist of 190 patients. The data were analysed and the final observations were tabulated as below.

Graph 1: Distribution of the number of subjects according to age group



In this study, in case group the maximum number of patients were in the age group of 18-30 years which were 46.8% (n =89) of total followed by age group 31–50 years having 32.6% (n = 62) and 39 (20.5%) were 51-60 years. In control group the maximum number of patients were in the age group of 18-30 years which were 48.9% (n =93) of total followed by age group 31–50 years having 34.7% (n = 66) and 31 (16.3%) were 51-60 years in Graph 1.

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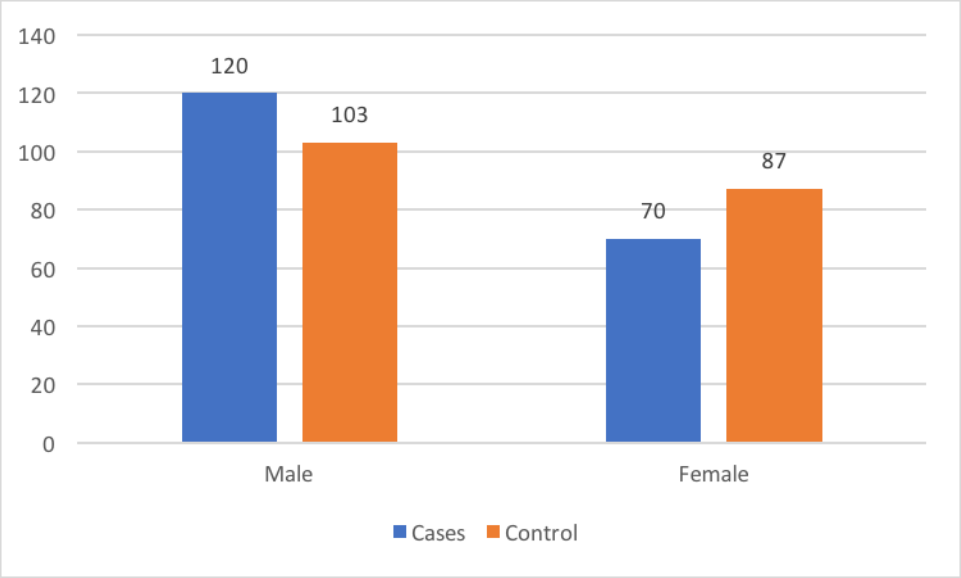
Graph 2: Distribution of Gender



In Graph 2, of the 190 samples in case group, 120 were males and 70 females, which correspond to 63.1% of male and the rest female. Of the 190 samples in control group, 103 were males and 87 females, which correspond to 54.3% of male and the rest female.

Table 3: Distribution of the Lipid profile in case and control group

Lipid profile (mg/dl)	Case group	Control group	p-value
Cholesterol	213.47±23.31	185.23±17.42	>0.05
Triacylglycerol	172.05±18.83	126.83±13.21	>0.05
HDL	43.34±6.91	45.48±5.20	>0.05
LDL	135.73±12.64	114.39±5.07	>0.05
VLDL	34.4±3.76	25.36±7.21	>0.05

In table 6, Cholesterol level in case group 213.47±23.31 and control group 185.23±17.42 which is statistically significant (0.001). Triacylglycerol value in case group 172.05±18.83 and control group 126.83±13.21 which is statistically significant (0.001). HDL level in case group 43.34±6.91 and control group 45.48±5.20 which is statistically significant (0.001). LDL in case group 135.73±12.64 and control group 114.39±5.07 which is statistically significant (0.001). VLDL in case group 34.4±3.76 and control group 25.36±7.21 which is statistically significant (0.001).

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Table 4: Distribution of the Blood glucose in case and control group

Blood glucose	Case group	Control group	p-value
Blood Glucose (mg/dl)	108.74±12.83	91.85 ± 9.53	>0.05

In table 4, increase of Fasting Blood Glucose (mg/dl) in case group 158.74±37.83 as compared with 86.85 ± 11.53 in control group statistically significant (0.041). Increase of Post Prandial Blood Glucose (mg/dl) in case group 264.60±53.50 when compared to control subjects 108.42±14.82 which is statistically significant (0.001).

Discussion:

Psoriasis is a chronic immune-mediated inflammatory disease, characterized by keratinocyte proliferation, that is characterized by well-defined red plaques with silvery-white scales, which can involve any region of the skin (and other components of the integumentary system, including the nails), but is usually located on the elbows, knees, scalp and presacral region. [15]

Serum lipids levels were examined in many different groups of psoriatic patients in comparison to relevant healthy controls. [16] The blood lipid results are considerably dependent on group matching (age, gender, and ethnic and cultural factors). In most of the studies, a statistically significant elevated level of total cholesterol (TC), low-density lipoprotein (LDL) cholesterol and/or triglycerides (TG) in psoriatic patients was demonstrated comparing to a healthy control group. [17] Moreover, there was a decrease of high density lipoprotein (HDL) cholesterol in the serum of psoriatic patients. [18] Only in a few studies no differences in lipid serum levels between psoriatic patients and healthy controls were observed. [19]

In the presented study, males were found to have greater abnormalities in serum lipids as compared to females. This may be because the majority of female patients were younger as compared to males and had not reached their menopause. The reasons for dyslipidaemia in psoriasis may be multiple. The structural and functional changes in digestive tract, immune mechanisms involving IL-6 and tumour necrosis factor, and C-reactive proteins and cellular oxidative stress may be responsible for altered lipid metabolism. [20]

In our study, there was an increase in the serum total cholesterol levels and LDL, VLDL, and triglyceride levels but a fall in the levels of HDL in patients with long term psoriasis (more than 5 years). Though the changes in HDL based on disease severity and duration were not significant, they form an interesting observation. HDL levels, which are protective against cardiovascular risk, show changes different from other lipids. This could signify increased risk and systemic damage with disease severity and duration. [21]

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Various external and internal factors may possibly work together leading to lipid aberrations in psoriasis. The chronic nature of the disease influences lifestyle of the patient setting up a vicious cycle. [22] Smoking, increased alcohol intake, and stress increase the oxidative damage in the body. Obesity is an important comorbidity reported in psoriasis which also contributes to the cardiovascular morbidity. [22] Psoriasis is a T helper cell response, leading to increased levels of TNF-α which are also found in the atherosclerotic plaque contributing to cardiovascular morbidity. [23] TNF- α is also shown to cause insulin resistance which is suggested to interfere negatively with lipid metabolism. [24] Changes in TNF-α levels with the duration of psoriasis could provide more definitive answer to hyperlipidemia in patients with long term psoriasis. [25]

The lipids present in the scales of psoriasis have shown increased levels of cholesterol and low free fatty acids. [26] During exfoliation there is loss of cholesterol from the scales. This could be the reason for increased synthesis of serum cholesterol causing dyslipidemia. Functional and structural abnormalities have been reportedly seen in various segments of gastrointestinal tract. [27] Intestines play an important role in the absorption, composition, and degradation of lipoproteins. Thus, there is a possibility that the structural abnormalities in the gastrointestinal tract can adversely affect the lipid levels. [28]

Nowadays there is an increased interest in HDL cholesterol, because clinical and epidemiological studies showed an inverse relationship between the level of HDL and the development of atherosclerosis. [29] HDL is a very important factor in reverse cholesterol transport (RCT). It takes part in the transport of cholesterol produced or accumulated in the peripheral tissues to the liver or other steroidogenic tissues and exerts the antioxidant, anti-inflammatory, antithrombotic and fibrinolytic action. [20] It should be underlined that neither HDL nor LDL is “bad cholesterol,” because both are essential for the proper transport of cholesterol. [29]

Conclusion:

In conclusion, lipid metabolism abnormalities and oxidative stress are common among patients with psoriasis and PSA. Every patient should be evaluated to determine total CV risk for the purpose of ensuring appropriate patient education and making decisions on the intensity of treatment. Effective treatment of patients with psoriasis or PSA could reduce the risk of cardiovascular diseases. Based on the results of our study, we recommend regular monitoring of patients with psoriasis for the presence of comorbidities which have a definite adverse effect on both psoriasis and the CVS. Early detection and control of these risk factors is imperative to reduce the morbidity and mortality associated with these conditions, and to provide a better quality of life to these patients.

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References:

1. Olsen AO, Wilsgaard T, Furberg AS. Is the prevalence of psoriasis increasing? A 30–year follow-up of a population–based cohort. Br J Dermatol. 2013;168:1303–10.
2. Harden JL, Krueger JG, Bowcock AM. The immunogenetics of psoriasis: a comprehensive review. J Autoimmun. 2015;64:66–73.
3. Pariser D, Schenkel B, Carter C, Farahi K, Brown TM, Ellis CN, and Psoriasis Patient Interview Study Group. A multicenter, non-interventional study to evaluate patient-reported experiences of living with psoriasis. J Dermatol Treat. 2015;1–8.
4. Alshami MA. Clinical profile of psoriasis in Yemen, a 4-year retrospective study of 241 patients. J Eur Acad Dermatol Venereol. 2010;24(Suppl. 4):14.
5. Falodun OA. Characteristics of patients with psoriasis seen at the dermatology clinic of a tertiary hospital in Nigeria: a 4-year review 2008–2012. J Eur Acad Dermatol Venereol. 2013;27(Suppl. 4)
6. Reich K, Krüger K, Mössner R, Augustin M. Epidemiology and clinical pattern of psoriatic arthritis in Germany: a prospective interdisciplinary epidemiological study of 1511 patients with plaque-type psoriasis. Br J Dermatol. 2009;160(5):1040–7.
7. Augustin M, Radtke MA, Glaeske G, Reich K, Christophers E, Schaefer I et al. Epidemiology and Comorbidity in Children with Psoriasis and Atopic Eczema. Dermatology. 2015;231(1):35–40.
8. Vena GA, Altomare G, Ayala F, Berardesca E, Calzavara-Pinton P, Chimenti S et al. Incidence of psoriasis and association with comorbidities in Italy: a 5-year observational study from a national primary care database. Eur J Dermatol. 2010;20(5):593–8.
9. Fuji R, Mould JF J, Tang B, Brandt H, Pomerantz D, Chapnick J et al. Burden of disease in patients with diagnosed psoriasis in Brazil: results from 2011 national health and wellness survey (NHWS). Value Health. 2012;15(4):A107.
10. Stern RS, Nijsten T, Feldman SR, Margolis DJ, Rolstad T. Psoriasis is common, carries a substantial burden even when not extensive, and is associated with widespread treatment dissatisfaction. J Investig Dermatol Symp Proc. 2004;9(2):136–9.
11. Kimball AB, Jacobson C, Weiss S, Vreeland MG, Wu Y. The psychosocial burden of psoriasis. Am J Clin Dermatol. 2005;6(6):383–92.
12. De Korte J, Sprangers MA, Mombers FM, Bos JD. Quality of life in patients with psoriasis: a systematic literature review. J Investig Dermatol Symp Proc. 2004;9(2):140–7.
13. Zachariae H, Zachariae R, Blomqvist K, Davidsson S, Molin L, Mørk C et al. Quality of life and prevalence of arthritis reported by 5,795 members of the Nordic Psoriasis Associations. Data from the Nordic Quality of Life Study. Acta Derm Venereol. 2002;82(2):108–13.

14. Krueger G, Koo J, Lebwohl M, Menter A, Stern RS, Rolstad T. The impact of psoriasis on quality of life: results of a 1998 National Psoriasis Foundation patient-membership survey. Arch Dermatol. 2001;137(3):280–4.
15. Weiss SC, Kimball AB, Liewehr DJ, Blauvelt A, Turner ML, Emanuel EJ. Quantifying the harmful effect of psoriasis on health-related quality of life. J Am Acad Dermatol. 2002;47(4):512–8.
16. Global report on psoriasis 37 20. Kimball AB, Gieler U, Linder D, Sampogna F, Warren RB, Augustin M. Psoriasis: Is the impairment to a patient's life cumulative? J Eur Acad Dermatol Venereol. 2010;24(9):989–1004.
17. Moradi M, Rencz F, Brodszky V, Moradi A, Balogh O, Gulácsi L. Health status and quality of life in patients with psoriasis: an Iranian cross-sectional survey. Arch Iran Med. 2015;18(3):153–9.
18. Tang MM, Chang CC, Chan LC, Heng A. Quality of life and cost of illness in patients with psoriasis in Malaysia: a multicenter study. Int J Dermatol. 2013;52(3):314–22.
19. Augustin M, Krüger K, Radtke MA, Schwippl I, Reich K. Disease severity, quality of life and health care in plaquetype psoriasis: a multicenter cross-sectional study in Germany. Dermatology. 2008;216(4):366–72.
20. Russo PAJ, Ilchef R, Cooper AJ. Psychiatric morbidity in psoriasis: a review. Australas J Dermatol. 2004;45(3):155– 9;
21. Sampogna F, Tabolli S, Abeni D, IDI Multipurpose Psoriasis Research on Vital Experiences (IMPROVE) investigators. Living with psoriasis: prevalence of shame, anger, worry, and problems in daily activities and social life. Acta Derm Venereol. 2012;92(3):299–303.
22. Mrowietz U, Steinz K, Gerdes S. Psoriasis: To treat or to manage? Exp Dermatol. 2014;23(10):705–9.
23. Parisi R, Symmons DPM, Griffiths CEM, Ashcroft DM, and the Identification and Management of Psoriasis and Associated ComorbidiTy (IMPACT) project team. Global epidemiology of psoriasis: a systematic review of incidence and prevalence. J Invest Dermatol. 2013;133(2):377–85.
24. Gelfand JM, Feldman SR, Stern RS, Thomas J, Rolstad T, Margolis DJ. Determinants of quality of life in patients with psoriasis: a study from the US population. J Am Acad Dermatol. 2004;51(5):704–8.
25. Nijsten T, Meads DM, de Korte J, Sampogna F, Gelfand JM, Ongenae K et al. Cross-cultural inequivalence of dermatology-specific health-related quality of life instruments in psoriasis patients. J Invest Dermatol. 2007;127(10):2315–22.
26. Augustin M, Radtke MA. Quality of life in psoriasis patients. Expert Rev Pharmacoecon Outcomes Res. 2014;14(4):559–68.
27. Prins M, Krabbe PFM, Swinkels QOJ, de Boo T, van de Kerkhof PCM, van der Valk PGM. The effect of treatment on quality of life in psoriasis patients. Acta Derm Venereol. 2005;85(4):304–10.

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28. Vardy D, Besser A, Amir M, Gesthalter B, Biton A, Buskila D. Experiences of stigmatization play a role in mediating the impact of disease severity on quality of life in psoriasis patients. Br J Dermatol. 2002;147(4):736–42.
29. Ammar-Khodja A, Benkaidali I, Bouadjar B, Serradj A, Titi A, Benchikhi H et al. EPIMAG: International CrossSectional Epidemiological Psoriasis Study in the Maghreb. Dermatology. 2015;231(2):134–44.