Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i1.4080

ASSOCIATION OF CARDIOVASCULAR AND ENDOCRINOLOGICAL DISORDERS WITH POSRAISIS

Azeen Razzaq[1*], Ali Hassan Sajjad[2], Areeha Munawar[3], Shaista Mumtaz[4], Isma Kauser[5], Humna Naseer[6], Zarnishal[7], Ali Asim Dilshad[8]

[1*]Rawalpindi Medical University, Rawalpindi - Pakistan
[2,3,4,6,7]Shaikh Zayed Hospital, Lahore - Pakistan
[5]Kashmir General Hospital, Islamabad - Pakistan
[8]King Edward Medical University, Lahore - Pakistan

***Corresponding author:** Azeen Razzaq
*Rawalpindi Medical University, Rawalpindi – Pakistan. Email: azeenrazzaq100@gmail.com

Abstract

Objectives: To find out the association of cardiovascular and endocrinological disorders with psoriasis

Materials: In the Department of Dermatology of a tertiary care hospital, a cross-sectional study was carried out from 2022 to 2023 with approval from the hospital's ethical review committee. The current study included fifty psoriasis patients who presented in the dermatology outpatient department of a tertiary care hospital in Lahore as cases. As a control group, fifty patients with skin conditions other than psoriasis were included, and the prevalence of endocrinological and cardiovascular diseases was compared between the two groups. Using SPSS version 16, the Student t test was used to compare the means of different variables. P values less than 0.05 were considered statistically significant.

Result: The gender ratio, mean age, and percentage of smokers were similar in both groups. However, mean BMI was higher in psoriatic patients in comparison to non psoriatic patients. The prevalence of diabetes mellitus, hypertension, decreased HDL, hypertension, and myocardial infarction was higher in psoriatic patients compared to non-psoriatic patients. In comparison to non-psoriatic patients, patients with psoriasis had higher mean blood pressure, mean BMI, mean triglyceride levels (TAG), and mean fasting blood glucose levels (FBGL). In comparison to non-psoriatic patients, the mean value of high density lipoproteins was lower in psoriatic patients.

Conclusion: Raised mean fasting BSR, TAG, low HDL, elevated mean blood pressure, and elevated mean BMI are all statistically positively correlated with psoriasis.

Introduction

1–3% of people have psoriasis, a chronic inflammatory skin condition. According to epidemiological studies, psoriasis patients have significantly higher rates of diabetes, heart failure, and hypertension than control subjects [1], [2]. [3] Furthermore, severe psoriasis has been linked to a higher death rate from cardiovascular disease, and psoriasis may increase the risk of myocardial infarction on its own, particularly in younger patients[4]. Psoriasis and metabolic syndrome may share overlapping inflammatory pathways and genetic predispositions as part of their underlying Pathophysiology. In

addition to encouraging epidermal hyperplasia in psoriasis, chronic Th-1 and Th-17-mediated inflammation with dysregulation of cytokines, such as tumour necrosis factor-α and interleukin-6, may also oppose insulin signalling, change the expression of adipokines, and contribute to insulin resistance and obesity. Conversely, by encouraging chronic inflammation and angiogenesis, hyperinsulinemia in the metabolic syndrome may increase the likelihood or severity of psoriasis [5][6]. As per the guidelines of the Adult Treatment Panel III (ATP III) of the National Cholesterol Education Programme (NCEP), the diagnosis of Metabolic Syndrome (MetS) necessitates the existence of ≥3 of the following: waist circumference >102 cm (men) or >88 cm (women); blood pressure ≥130/85 mm Hg; triglycerides ≥150 mg/dL; high-density lipoprotein (HDL) <40 mg/dL (men) or <50 mg/dL (women); and fasting plasma glucose ≥110 mg/dL [7]. Globally, there has been consistent observation of a higher prevalence of MetS among psoriasis patients, including children and adolescents, when compared to the general population [8]. In a large population-based study conducted in the UK, Langan SM et al. discovered that, independent of age and gender, participants with psoriasis had a higher prevalence of MetS than controls (odds ratio [OR]: 1.50, 95% confidence interval [CI]: 1.40–1.61). The results of this study were the first to demonstrate a dose-response relationship between the incidence of MetS and the severity of psoriasis. Patients with mild, moderate, and severe psoriasis had increased odds of developing MetS compared to controls of 22%, 56%, and 98%, respectively [9]. It is thought that environmental factors, such as dietary habits and lifestyle choices, which are modifiable risk factors in the pathogenesis of psoriasis, play a significant role in the increasing prevalence of psoriasis, despite the condition's genetic basis remaining unchanged [10].

Methodology

In the Department of Dermatology of a tertiary care hospital, a cross-sectional study was carried out from 2022 to 2023 with approval from the hospital's ethical review committee. Fifty psoriatic patients of both genders and ages ranging from 30 to 60 years were included in the study after providing their informed consent. Fifty patients attending dermatology OPD with any skin disease other than psoriasis were taken as control to compare it with cases. Patients were chosen using non-probability consecutive sampling. Patients with age above 30 years, having disease duration of atleast 1 year, BSA >10% affected by psoriasis and not receiving any medication for psoriasis at least 3 months before enrollment in case group. Specifics about the demographics were noted. A sample of venous blood was drawn while fasting and sent to the hospital's laboratory for HDL, TAG and blood sugar levels. Blood pressure and body mass index(BMI) was done by investigation officer. The Student t test was utilised to compare the means of various variables using SPSS version 16.P values deemed statistically significant were those less than 0.05.

Objectives

To find out the association of metabolic syndromes in psoriatic patients

Keywords

Cardiovascular, Psoraisis, Endocrinological disorders.

Results

The gender ratio, mean age, and percentage of smokers were similar in both groups. However, mean BMI was higher in psoriatic patients in comparison to non psoriatic patients (Table 1)

	Case(50)	**Control(50)**
Male to Female ratio	3:1	2.3:1
Mean age of participants(years)	47.12 ±6.31	50.56 ±4.21
Mean BMI(Kg/m^2)	25.51± 4.2	19.4±5.3
Smokers	21	17

Table 1: Demographics of patients

The prevalence of diabetes mellitus, hypertension, decreased HDL, hypertension, and myocardial infarction was higher in psoriatic patients compared to non-psoriatic patients (Table 2).

	Cases	**Control**
Fasting Glucose(>100 mg/dl)	35(70%)	14 (28%)
TAG levels(>150 mg/dl)	19(38%)	04 (8%)
HDL levels(<50 mg/dl)	25 (50%)	7 (14%)
Blood pressure(>140/90 mmHg)	40(80%)	21 (42%)
Myocardial infarction	29(58%)	10 (20%)

Table 2: Clinical profile of patients with psoriatic and non psoriatic skin disorder

In comparison to non-psoriatic patients, patients with psoriasis had higher mean blood pressure, mean BMI, mean triglyceride levels (TAG), and mean fasting blood glucose levels (FBGL).In comparison to non-psoriatic patients, the mean value of high density lipoproteins was lower in psoriatic patients. **(Table 3)**

	Cases	**Control**	**P value**
Fasting Glucose (>100 mg/dl)	145.31± 30.21	101.14 ±11.1	0.005
TAG levels(>150 mg/dl)	200.41 ±20.21	135.13 ±10.21	0.000
HDL levels(<50 mg/dl)	28.19± 5.71	58.31 ±5.37	0.002
Mean Blood pressure(mmHg)	128.21± 7.56	101.21± 6.78	0.001
Mean BMI(Kg/m^2)	22.51± 4.2	19.4±5.3	0.001

Table 3: Comparison of cardiovascular and endocrinological derangements between Cases and Controls.

Discussion

According to our research, the prevalence of diabetes was higher in psoriasis patients (70% vs. 28%, p 0.005) than in controls. Our results are in line with those of Wan, M. T. et al., who found that patients with psoriasis that affects 10% or more of their body surface area have a 60% increased risk of developing type 2 diabetes each year. This means that severe psoriasis causes an additional 25,000 new cases of diabetes each year in the world [11]. Psoriasis may be a pre-diabetic condition because normal glucose-tolerant patients with moderate to severe psoriasis were more insulin-resistant than controls [12]. Similar to psoriasis, type 2 diabetes (T2DM) is a multifactorial, complex disease with impaired insulin secretion from pancreatic beta cells as well as peripheral and hepatic insulin resistance. The primary pathogenetic connection between psoriasis and type 2 diabetes could be identified in the rise in psoriasis of TNF-α, a pro-inflammatory cytokine that is crucial in the development of insulin resistance, by decreasing the insulin receptor's tyrosine-kinase activity [13]. A systematic review and meta-analysis of 27 observational studies was conducted in 2013 by Armstrong et al. They found that psoriasis patients had a 59% increased prevalence of DM overall, with a 97% increased prevalence in those with severe psoriasis. In studies that evaluated incident cases of diabetes mellitus, patients with psoriasis had a 27% higher risk of developing the disease than patients without it[14]. In a subsequent analysis of the relationship between psoriasis severity and diabetes mellitus, Wan et al. found that patients with psoriasis who had more disease per body surface area also had a significantly higher incidence of DM that is synchronous to our findings[15].

Hypertryglyceridemia is more common in psoriatic patients than in the general population (38% vs. 8%, p 0.000). Our results are in line with those of Salihbegovic et al., who showed that 39% of psoratic populations had hypertryglyceridemia[16]. In Denmark, psoriasis patients had a higher prevalence of hypercholesterolemia than the control group, and in Great Britain, psoriasis patients had higher levels of triglycerides (36% vs. 28%) than the control group[17][18]. Melczer discovered phospholipid composition alterations in psoriatic foci and proposed that lipid deposition in the reticular-endothelial system was the cause of inflammation, congestion, and parakeratosis.Additionally, it was proposed

that the ongoing separation of psoriatic scales resulted in a permanent loss of lipids, which may have an impact on abnormalities in serum lipid levels [19][20].

In comparison to the control group, the psoraisis population has lower HDL levels (50% vs. 14%, p 0.002). Mehta et al. discovered that 112 psoriasis patients had lower HDL efflux capacity and a more atherogenic lipoprotein profile than controls[21]. Low HDL levels have been linked to psoraisis, as explained by Kimball A.B. et al[22].

In the current study, the incidence of MI in psoriasis was three times higher than in the control group (58% vs. 20%, p 0.0125). Current study is supported by several other studies. Patients with severe psoriasis, but not those with mild psoriasis, have an increased risk of myocardial infarction, according to population-based studies done in Denmark[23]. Additionally, a Japanese epidemiological study revealed a link between coronary heart disease and psoriasis[24]. In a large population-based cohort study conducted in 2006, Gelfand et al. found that patients with psoriasis had an increased adjusted relative risk for MI, which was greatest in younger patients, especially in those with severe psoriasis. The study included 127,139 patients with mild psoriasis and 3837 patients with severe psoriasis in comparison with 556,995 control patients (aged 20 to 90 years) who did not have psoriasis[4].

In patients with psoriasis, hypertension is more common (80% vs 22%, p 0.001) that is 1.9 times of control population. Our results are consistent with those of Ghiasi, M. et al., who demonstrate that the incidence of hypertension is 2.2 times higher in patients with psoriasis than in controls[25]. Furthermore, a large-scale cohort study carried out in the US revealed that individuals with severe psoriasis had a markedly higher risk of developing hypertension, highlighting the necessity of a thorough cardiovascular risk assessment in this population [26].

Cases' mean BMI was 22.51± 4.2 and control's was 19.4±5.3 (p 0.001). In a case-control study on psoriasis, Farshchian et al. in Hamadan found that the BMI of cases (26.36±4.71 kg/m2) was significantly (P=0.02) higher than that of controls (24.6±3 kg/m2) [27]. In a systematic review of the literature, Felming et al. found that seven out of nine articles showed a significant correlation between higher BMI and increased psoriasis severity [28]. In a meta-analysis of 16 observational studies, Armstrong et al. found that patients with psoriasis had a pooled odds ratio (OR) for obesity of 1.66 (95% confidence interval [CI]: 1.46–1.89) when compared to patients without psoriasis. In the meantime, compared to people with mild psoriasis, those with more severe cases have a higher chance of being obese[29]. According to certain research, inflammatory cytokines may have an impact on the severity and duration of psoriasis, which helps to explain the correlation between psoriasis and BMI [30].

Conclusion

Raised mean fasting BSR, TAG, low HDL, elevated mean blood pressure, and elevated mean BMI are all statistically positively correlated with psoriasis.

References

1. Schon MP, Boehncke WH. Psoriasis. N Engl J Med 2005; 352:1899-912.
2. Gelfand JM, Weinstein R, Porter SB, Neimann AL, Berlin JA, Margolis DJ. Prevelance and treatment of psoriasis in the United Kingdom: A population-based study. Arch Dermatol 2005; 141:1537-41.
3. Henseler T, Christophers E. Disease concomitance in psoriasis. J Am Acad Dermatol 1995; 32:982-6.
4. Gelfand JM, Neimann AN, Shin DB, Wang X, Margolis DJ, Troxel AB. Risk of myocardial infarction in patients with psoriasis. JAMA 2006; 296:1735-41.

5. Davidovici BB, Sattar N, Prinz JC, Puig L, Emery P, Barker JN, et al. Psoriasis and systemic inflammatory diseases: potential mechanistic links between skin disease and co-morbid conditions. J Invest Dermatol. 2010 Jul;130(7):1785–96.
6. Azfar RS, Gelfand JM. Psoriasis and metabolic disease: epidemiology and pathophysiology. Current opinion in rheumatology. 2008 Jul;20(4):416–22. [Research Support, N.I.H., Extramural Review]
7. National Cholesterol Education Program (US). Expert Panel on Detection, and Treatment of High Blood Cholesterol in Adults. Third report of the National Cholesterol Education Program (NCEP) Expert Panel on detection, evaluation, and treatment of high blood cholesterol in adults (Adult Treatment Panel III). No. 2. The Program, 2002.
8. Gisondi, P., Fostini, A. C., Fossà, I., Girolomoni, G., & Targher, G. (2018). Psoriasis and the metabolic syndrome. Clinics in dermatology, 36(1), 21–28. https://doi.org/10.1016/j.clindermatol.2017.09.005
9. Langan, S. M., Seminara, N. M., Shin, D. B., Troxel, A. B., Kimmel, S. E., Mehta, N. N., Margolis, D. J., & Gelfand, J. M. (2012). Prevalence of metabolic syndrome in patients with psoriasis: a population-based study in the United Kingdom. The Journal of investigative dermatology, 132(3 Pt 1), 556–562.
10. Yamazaki F: Psoriasis: Comorbidities. J Dermatol. 48:732–740. 2021.
11. Wan, M. T., Shin, D. B., Hubbard, R. A., Noe, M. H., Mehta, N. N., & Gelfand, J. M. (2018). Psoriasis and the risk of diabetes: A prospective population-based cohort study. Journal of the American Academy of Dermatology, 78(2), 315–322.e1.
12. Gyldenløve, M., Storgaard, H., Holst, J. J., Vilsbøll, T., Knop, F. K., & Skov, L. (2015). Patients with psoriasis are insulin resistant. Journal of the American Academy of Dermatology, 72(4), 599–605.
13. Boehncke W. H. (2018). Systemic Inflammation and Cardiovascular Comorbidity in Psoriasis Patients: Causes and Consequences. Frontiers in immunology, 9, 579.
14. Armstrong AW, Harskamp CT, Armstrong EJ. Psoriasis and the risk of diabetes mellitus: a systematic review and meta-analysis. JAMA Dermatol. 2013;149(1):84–91.
15. Wan MT, Shin DB, Hubbard RA, Noe MH, Mehta NN, Gelfand JM. Psoriasis and the risk of diabetes: a prospective population-based cohort study. J Am Acad Dermatol. 2018;78(2):315–322.e1.
16. Salihbegovic, E. M., Hadzigrahic, N., Suljagic, E., Kurtalic, N., Hadzic, J., Zejcirovic, A., Bijedic, M., & Handanagic, A. (2015). Psoriasis and dyslipidemia. Materia socio-medica, 27(1), 15–17.
17. Gyldenløve M, Jensen P, Linneberg A, Thyssen JP, Zachariae C, Hansen PR, et al. Psoriasis and the Framingham risk score in a Danish hospital cohort. Int J Dermatol. 2013
18. Langan SM, Seminara NM, Shin DB, Troxel AB, Kimmel SE, Mehta NN, et al. Prevalence of metabolic syndrome in patients with psoriasis: a population-based study in the United Kingdom. J Invest Dermatol. 2012;132(3 Pt 1):556–562.
19. A. Pietrzak, I. Jastrzebska, D. Krasowska et al., “Serum pancreatic lipase [EC 3.1.1.3] activity, serum lipid profile and peripheral blood dendritic cell populations in normolipidemic males with psoriasis,” Journal of Molecular Catalysis B, vol. 40, no. 3-4, pp. 144–154, 2006.
20. D. I. Wilkinson, “Lipid metabolism in psoriasis,” in Proceedings of the International Symposium on Psoriasis, E. M. Farber, A. J. Cox, and P. H. Jacobs, Eds., pp. 277–287, Stanford University Press, Stanford, Calif, USA, 1971.
21. Mehta NN, Li R, Krishnamoorthy P, Yu Y, Farver W, Rodrigues A, et al. Abnormal lipoprotein particles and cholesterol efflux capacity in patients with psoriasis. Atherosclerosis. NIH Public Access. 2012; 224:218–21.
22. Kimball, A. B., Szapary, P., Mrowietz, U., Reich, K., Langley, R. G., You, Y., Hsu, M. C., Yeilding, N., Rader, D. J., & Mehta, N. N. (2012). Underdiagnosis and undertreatment of cardiovascular risk factors in patients with moderate to severe psoriasis. Journal of the American Academy of Dermatology, 67(1), 76–85.

23. Egeberg A., Thyssen J.P., Jensen P., Gislason G.H., Skov L. Risk of myocardial infarction in patients with psoriasis and psoriatic arthritis: A nationwide cohort study. Acta Derm. Venereol. 2017; 97:819–824. doi: 10.2340/00015555-2657
24. Shiba M., Kato T., Funasako M., Nakane E., Miyamoto S., Izumi T., Haruna T., Inoko M. Association between psoriasis vulgaris and coronary heart disease in a hospital-based population in Japan. PLoS ONE. 2016; 11:e0149316.
25. Ghiasi, M., Nouri, M., Abbasi, A., Hatami, P., Abbasi, M. A., & Nourijelyani, K. (2011). Psoriasis and increased prevalence of hypertension and diabetes mellitus. Indian journal of dermatology, 56(5), 533–536.
26. Duan, Xi MD; Liu, Junbo MD; Mu, Yunzhu MD; Liu, Ting MD; Chen, Yujuan MD Yu, Ruichao MD; Xiong, Xincai MD; Wu, Tao MD, PhD*. A systematic review and meta-analysis of the association between psoriasis and hypertension with adjustment for covariates. Medicine 99(9):p e19303, February 2020.
27. Farshchian M, Ansar A, Sobhan M. Associations between cardiovascular risk factors and psoriasis in Iran. Clin Cosmet Investig Dermatol. 2015; **8**:437–442.
28. Felming P, Kraft J, Gulliver WP, Lynde C. The relationship of obesity with the severity of psoriasis: a systematic review. J Cutan Med Surg. 2015;**19**(5):450–456.
29. Armstrong AW, Harskamp CT, Armstrong EJ. The association between psoriasis and obesity: a systematic review and meta-analysis of observational studies. Nutr Diabetes. 2012;**2**:e54.
30. Hamminga EA, van der Lely AJ, Neumann HAM, Thio HB. Chronic inflammation in psoriasis and obesity: implications for therapy. Med Hypotheses. 2006;**67**(4):768–773.