GEORGIAN BIOMEDICAL NEWS

ISSN (Online): 2720-8796 ISSN (Print): 2720-7994 VOLUME 1. ISSUE 2. APRIL-JUNE 2023

High risk of cardiovascular disease in patients with chronic plaque psoriasis

Kakhaber Chelidze,[1] Irma Mamatsashvili,[1] Medea Jgharkava,[1] Maia Matoshvili,[2] Khatuna Khijakadze,[3] Eter Tsetskhladze[3]

DOI: 10.52340/GBMN.2023.01.01.30

ABSTRACT

BACKGROUND: Psoriasis has recently been associated with systemic inflammation. Chronic skin inflammation leads to systemic inflammation, which triggers oxidative stress, dyslipidemia, endothelial dysfunction, and insulin resistance, increasing the risk of cardiovascular complications in these patients. Although the link between dyslipidemia and psoriasis has been demonstrated through various worldwide studies, dyslipidemia in psoriatic patients is frequently neglected and mistreated in daily practice. Furthermore, epidemiological studies have revealed that the life expectancy of patients with severe psoriasis is 3 to 5 years lower than that of non-psoriatic controls due to comorbidities, particularly cardiovascular disease (CVD). Consequently, many recent studies have stressed the importance of further screening laboratory markers for the early identification of cardiovascular risk factors and their follow-up.

OBJECTIVES: The present study aimed to assess lipid profiles in patients with chronic plaque psoriasis to find cardiovascular disease risk factors and identify a possible association between the c risk score and plaque psoriasis severity.

METHODS: We investigated the lipid profiles of 70 patients with moderate to severe chronic plaque psoriasis (CPP) and 30 healthy individuals. The psoriasis area and severity index (PASI) was used to determine the severity of psoriasis. In addition, all patients completed Dermatology Life Quality Index (DLQI) questionnaire.

RESULTS: Elevated concentration of total serum cholesterol (TC), triglycerides (TGs), and low-density lipoprotein cholesterol (LDL-C) and low concentration of high-density lipoprotein cholesterol (HDL-C) was detected in psoriasis patients compared to controls. Above mentioned alterations were more prominent in female patients with severe psoriasis.

CONCLUSIONS: Dyslipidemia is a common finding in patients with psoriasis and correlates with the severity of psoriasis. Lipid profiles should be a part of routine screening tests in patients with chronic plaque psoriasis for the early identification of dyslipidemia and the timely initiation of lipid-lowering treatment.

KEYWORDS: Cardiovascular risk; dyslipidemia; psoriasis.

BACKGROUND

Psoriasis is an immune-mediated chronic inflammatory skin disease that affects 2-4% of the adult population in the world.[1] Psoriasis has also been identified as a multisystem chronic inflammatory disorder associated with multiple comorbidities. Therefore, psoriatic arthritis is a common comorbidity that should be screened for in all patients.

Plaque psoriasis, affecting 85-90% of patients, is associated with systemic inflammation, oxidative stress, dyslipidemia, endothelial dysfunction, and insulin resistance, and, therefore, with a high risk of cardiovascular disease.[2,3] Even in patients with inflammatory musculoskeletal disease associated with psoriasis, skin manifestations precede the onset of arthritis with a median time of seven to eight years. In addition, previous epidemiological studies have shown the high prevalence of other comorbidities and cardiovascular risk factors in patients with psoriasis, including metabolic syndrome, obesity, hypertension, diabetes mellitus, insulin resistance, and dyslipidemia.[4-6]

According to existing evidence, patients with psoriasis have a disturbance in lipid metabolism and a predisposition for atherosclerosis. This alteration in the lipid profile is due to the inflammatory milieu maintained by the cytokines. Atherosclerosis is considered a chronic inflammatory disease of blood vessels and the most common mechanism of the development of cardiovascular disease. Psoriasis and atherosclerosis share a common upregulation of Th1 and Th 17 cytokines, systemic expression of adhesion molecules, and endothelin.[7,8] Similarly, oxidative stress plays a significant role in enhancing the inflammatory process of psoriasis. For instance, leukocyte enzymes, such as proteolytic enzymes or myeloperoxidase, produce excess reactive oxygen species (ROS), leading to oxidative stress. In the epidermis and psoriatic plaques, ROS oxidizes lipids, proteins, and low-density lipoproteins (LDLs), which results in cell damage. In

contrast to normal skin, the skin of patients with psoriasis contains oxidized LDLs.[9-11]

The association of dyslipidemia with psoriasis has been established in various international studies, but in daily practice, dyslipidemia in psoriatic patients is often overlooked and untreated.[12,13] Furthermore, epidemiological studies have shown that due to comorbidities, especially cardiovascular diseases (CVD), the life expectancy of patients with severe psoriasis is 3 to 5 years shorter than that of non-psoriatic controls.[14,15] Therefore, additional screening for cardiovascular risk is critical and necessary in patients with plaque psoriasis.

The present study aimed to assess lipid profiles in patients with chronic plaque psoriasis to identify cardiovascular risk factors and a possible correlation between the c risk score and plaque psoriasis severity.

METHODS

We evaluated 70 outpatients with newly diagnosed and treatment-naïve chronic plaque psoriasis aged 25 to 74 admitted to First University Clinic of Tbilisi State Medical University and Aleksandre Aladashvili Clinic from July 2020 to December 2022. The control group consisted of 30 healthy individuals. The patients with diabetes, metabolic syndrome and obesity, chronic kidney, and liver disease, medications affecting lipid metabolism (thiazides, beta-blockers, topical or systemic steroids, statins), and medications known to aggravate psoriasis were excluded.

The psoriasis area and severity index (PASI) was used to determine the severity of psoriasis.16 All patients completed Dermatology Life Quality Index (DLQI) questionnaire. In addition, detailed demographic data were collected. Furthermore, all patients were studied for waist circumference and Body Mass Index (BMI). Blood samples were collected after 12-hour fasting. In addition, serum total cholesterol (TC), triglycerides (TGs), high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C) were measured.

All patients were distributed among moderate and severe groups according to PASI score: moderate psoriasis with PASI=7-15 and DLQI=5-15, severe psoriasis with PASI >15, and any DLQI value.[17]

We used descriptive statistics and non-parametric tests to analyze data statistically. The student's t-test was performed to look for differences between groups. P values less than 0.05 were considered statistically significant.

RESULTS

The study included 70 patients with Chronic Plaque Psoriasis. There was no significant difference regarding baseline characteristics such as gender, age, BMI, hypertension, and smoking status between case and control groups. The mean disease duration was 12.6±7.5 years (Tab.1).

TABLE 1. Baseline characteristics of patients with psoriasis and healthy controls

Characteristics	Case group, n=70	Control group, n=30
Male, n (%)	38 (54.3)	18 (60)
Female, n (%)	32 (45.7)	12 (40)
Mean age, years	48.6±14.8	44.5±9.8
Current smoking, n (%)	22 (31.4)	9 (30)
Body Mass Index, kg/m^2	28±5.1	25.8±2.1
Hypertension, n (%)	22 (31.4)	9 (30)

Table 2 represents the data regarding the severity of psoriasis.

TABLE 2. The severity of psoriasis by gender distribution

	Male, n (%)	Female, n (%)
PASI=13.6±1.4 and DLQI=9.0±2.4	26 (54.2)	22 (45.8)
PASI=21.5±1.9and DLQI=11.5±1.8	12 (54.5)	10 (45.5)

Abbreviations: DLQI, dermatology life quality index questionnaire; PASI, psoriasis area and severity index.

We studied the indicators of lipid metabolism according to the severity of psoriasis in women and men and in the control group (Tab.3).

TABLE 3. Serum lipid levels in psoriasis patients and in healthy controls

	Case group n=70				Control group n=30	
	Moderate psoriasis n=48		Severe psoriasis n=22			
	Male n=26	Female n=22	Male n=12	Female n=10	Male n=18	Female n=12
TC, mg/dL	205.2±19.2	212.9±16.4	214.5±15.1*	218.1±6.3*	193.5±14.6	198.4±9.2
TGs, mg/dL	160.1±52.4*	169.4±58.8*	191.8±60.9*	203.3±58.5*	136.2±16.7	129.5±15.6
LDL-C, mg/dL	149.2±36.1	151.4±35.4	170.1±38.2	181.1±31.0	131.2±26.6	121.8±18.9
HDL-C, mg/dL	39.2±5.3*	39.9±5.5*	36.0±5.5*	33.6±4.5*	49.1±3.4	50.5±3.3

* $p<0.05$

Abbreviations: HDL-C, high-density lipoprotein cholesterol; LDL-C, low-density lipoprotein cholesterol; TC, total cholesterol; TGs, triglycerides.

DISCUSSION

Several diseases occur more often in patients with psoriasis than expected based on their prevalence in the general population. Patients with psoriasis are likelier to develop other chronic diseases such as psoriatic arthritis, metabolic syndrome (MetS), depression, non-alcoholic fatty liver disease, Crohn's disease, lymphoma, and cardiovascular disorders.[18]

The relationship between psoriasis and a high incidence of major adverse cardiovascular events (MACEs) has been observed in multiple epidemiologic studies. McDonald and Calabresi first demonstrated that the risk associated with vascular diseases was 2.2 times higher in more than 300 hospitalized patients with psoriasis than in controls with other dermatologic conditions.[19,20]

Psoriasis affects at least 125 million people across the world. Therefore, additional evaluation of the relationship

ISSN (Online): 2720-8796 ISSN (Print): 2720-7994

between the altered lipid profile and psoriasis is required. Statins are the mainstay of treatment for hyperlipidemia. However, statins also have immunomodulatory effects, which could benefit psoriasis. For example, statins reduce arterial wall inflammation.[21] Moreover, statins favor Th1-mediated immune responses, inhibit the induction of MHC II, prevent cytokine release from mast cells and mast cell degranulation, and inhibit interactions between pro-inflammatory chemokines in the skin.[22,23]

A 2020 meta-analysis of randomized controlled studies that investigated the effect of statins on psoriasis severity assessed with the Psoriasis Area and Severity Index (PASI) showed beneficial effects of statins not only on the lipid panel but also on psoriasis severity. In addition, they found that oral statins may improve psoriasis, particularly in patients with severe disease.[24]

In the present study, we found significantly elevated serum total cholesterol, triglycerides, and low-density lipoprotein cholesterol (LDL-C) and significantly lower concentrations of high-density lipoprotein cholesterol (HDL-C) in psoriasis patients compared to controls. In addition, the alterations mentioned above were more prominent in female patients with severe psoriasis (Tab.3).

The main limitation of our study is the small sample size, which must be more significant to make clear recommendations. In addition, further investigations are needed to assess the correlation between altered lipid metabolism and long-term cardiovascular risk in patients with psoriasis.

CONCLUSIONS

Based on the results, we conclude that dyslipidemia is a prevalent finding in psoriasis patients and correlates with the severity of psoriasis. Lipid analysis should be a part of routine screening tests in patients with chronic plaque psoriasis to assess the risk of cardiovascular disease and the need to initiate the treatment with lipid-lowering medications.

AUTHOR AFFILIATION

1 Department of Internal Medicine, Tbilisi State Medical University and Ingorokva High Medical Technologies University Clinic, Tbilisi, Georgia;
2 Department of Dermatology and Venereal Diseases, Tbilisi State Medical University (TSMU), Tbilisi, Georgia;
3 Aleksandr Aladashvili Clinic, Tbilisi, Georgia.

REFERENCES

1. Kim WB, Jerome D, Yeung J. Diagnosis and management of psoriasis. Can Fam Physician. 2017;63(4):278-85
2. Choi WJ, Park EJ, Kwon IH et al. Association between psoriasis and cardiovascular risk factors in Korean patients. Ann Dermatol 2010; 22:300-6.
3. Di Lisi D, Macaione F, Carrado E at al. Cardiovascular risk profile of patients with paoriasis. Recenti Prog Med 2013; 104:102-5.
4. Miller IM, Ellervik C, Yazdanyar S, Jemec GB. Meta-analysis of psoriasis, cardiovascular disease, and associated risk factors. J Am Acad Dermatol. 2013;69(6):1014-24.
5. Mehta NN, Azfar RS, Shin DB, Neimann AL, Troxel AB, Gelfand JM. Patients with severe psoriasis are at increased risk of cardiovascular mortality: cohort study using the General Practice Research Database. Eur Heart J. 2010;31(8):1000-6.
6. Y.C. Nakhwa, R. Rashmi, K.H. Basavaraj. Dyslipidemia in psoriasis: case-controlled study. Hindawi Publishing Corporation International Scholarly Research Notices Volume 2014, Article ID 729157, 5 pages
7. Shlyankevich J, Mehta NN, Krueger JG et al. Accumulating evidence for the association and shared pathogenic mechanisms between psoriasis and cardiovascular-related comorbidities. Am J Med 2014; 127:1148-53.
8. Gupta M, Chari S, Borkar M et al. Dyslipidemia and oxidative stress in patients with psoriasis. Biomed Res 2011; 22:221-4.
9. Gentile M, Peluso R, Di Minno MN et al. Association between small dense LDL and sub-clinical atherosclerosis in patients with psoriatic arthritis. Clin Rheumatol 2016; 35:2023-9.
10. Monique Kafle , Madhu Gyawalee , Amit Amatya et al. Dyslipidemia in psoriasis: case controlled study. Nepal Journal of Dermatology, Venereology & Leprology, Vol 19, No. 2, 2021:39-43.
11. Armstrong AW, Armstrong EJ, Fuller EN, Sockolov ME, Voyles SV. Smoking and pathogenesis of psoriasis: A review of oxidative, inflammatory and genetic mechanisms. Br J Dermatol 2011;165:1162-8
12. Shen Z, Munker S, Wang C, Xu L, Ye H, Chen H, et al. Association between alcohol intake, overweight, and serum lipid levels and the risk analysis associated with the development of dyslipidemia. J Clin Lipidol. 2014;8(3):273-8.
13. Kaur S, Kingo K, Zilmer M. Psoriasis and cardiovascular risk – do promising new biomarkers have clinical impact? Mediators Inflamm 2017; 2017:727-818.
14. N. N. Mehta, Y. Yu, R. Pinnelas et al., "Attributable risk estimate of severe psoriasis on major cardiovascular events," The American Journal of Medicine, vol. 124, no. 8, pp. e1–e6, 2011.
15. K. Abuabara, R. S. Azfar, D. B. Shin, A. L. Neimann, A. B. Troxel, and J. M. Gelfand, "Cause-specific mortality in patients with severe psoriasis: a population-based cohort study in the U.K," The British Journal of Dermatology, vol. 163, no. 3, pp. 586–590, 2010.
16. Langley RG, Ellis CN. Evaluating psoriasis with paoriasis area severity index, psoriasis global assessment and lattice system physician's global assessment. J Am Acad Dermatol 2004;51:563-9.
17. Llamas-Velasco M., de la Cueva P., Notario J., Martínez-Pilar L., Martorell A., Moreno-Ramírez D. Psoriasis moderada. Propuesta de definición. Actas Dermo-Sifiliográficas (Engl. Ed.) 2017;108:911–917.
18. Nestle FO, Kaplan DH, Barker J. Psoriasis. N Engl J Med. 2009;361(5):496–509.
19. McDonald CJ, Calabresi P. Occlusive vascular disease in psoriatic patients. N Engl J Med. 1973;288:912.
20. Caiazzo G, Fabbrocini G, Di Caprio R, et al. Psoriasis, cardiovascular events, and biologics: lights and shadows. Front Immunol. 2018;9:1668.
21. Pirro M, Simental-Mendía L, Bianconi V, Watts G, Banach M, Sahebkar A. (2019). Effect of statin therapy on arterial wall inflammation based on 18F-FDG PET/CT: a systematic review and meta-analysis of interventional studies J Clin Med. 8: E118.
22. Egesi A, Sun G, Khachemoune A, Rashid RM. (2010). Statins in skIn: research and rediscovery, from psoriasis to sclerosis J Drugs Dermatol. 9: 921-7.

ISSN (Online): 2720-8796 ISSN (Print): 2720-7994

23. Kim TG, Byamba D, Wu WH, Lee MG. (2011). Statins inhibit chemotactic interaction between CCL20 and CCR6 in vitro: possible relevance to psoriasis treatment Exp Dermatol. 20: 855-7.
24. Mateusz Socha, Aldona Pietrzak, Ewelina Grywalska el al. The effect of statins on psoriasis severity: a meta-analysis of randomized clinical trials. Arch Med Sci 2020;16(1).

The Georgian Biomedical News
ISSN (Online): 2720-8796 ISSN (Print): 2720-7994