Original Article

Serum Lipids and Lipoproteins in Patients with Psoriasis

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Abstract

Background: Psoriasis is a common chronic and recurrent inflammatory skin disorder characterized by hyperproliferation of keratinocytes and infiltration of T cells, monocytes/macrophages and neutrophils into dermal and epidermal layers of the skin. The prevalence of cardiovascular disorders in these patients is remarkably higher compared to normal individuals, which seems to be associated with the hyperlipidemia. This study was designed and conducted to investigate the serum lipid profile in psoriatic patients and its association with the severity of disease.

Materials and Methods: This case-control study was performed on 50 plaque-type psoriasis patients and 50 healthy individuals as control, matched for age and sex. Blood samples were collected after 14 h fasting. Serum triglyceride, cholesterol and lipoproteins were assayed using the standard kit (made by Pars Azmon Co. Iran).

Results: Certain parameters, including serum triglyceride, cholesterol, low density lipoprotein (LDL), and very low density lipoprotein (VLDL), were significantly higher in the case group compared to the controls (P < 0.001), while high density lipoprotein (HDL) was significantly lower in the former (P < 0.001). In addition, there was a significant relationship between severity of psoriasis and serum lipid profile.

Conclusion: The results have revealed the higher plasma level of lipids in psoriatic patients. This may elevate the risk of atherosclerosis, particularly cardiovascular disorders. Therefore, from the epidemiological point of view, screening psoriatic patients, particularly those with severe psoriasis, is recommended.

Keywords: Atherosclerosis, psoriasis, serum lipid profile

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Introduction

Psoriasis is a chronic inflammatory and autoimmune disorder with unknown etiology.[1] The prevalence rate of psoriasis ranges from 1% to 4.8%. Although it may involve all age groups, the mean age of its incidence is 17.8 years.[1] The disease is characterized by increased keratinocyte proliferation and alteration in dermal and epidermal T-cells, monocytes-macrophages and neutrophils.[2] Increased antigen presentation by dendritic cells and their presentation to T-lymphocytes lead to the following changes: T-cell activation and secretion of type 1 (TH1) cytokines like interferon, interleukin 2 and tumor necrosis factor alpha (TNF-α). These cytokines induce inflammatory changes in epidermis, yielding thick scaly plaques.[3] Recently, the role of T-lymphocytes in pathogenesis of psoriasis and atherosclerosis has been clarified. Psoriasis has been associated with an abnormal plasma lipid metabolism and diabetes, probability related to alterations in insulin secretion and sensitivity.[4] Furthermore, there is increased oxidative stress which is accompanied by a high frequency of cardiovascular disease.[5] The high rate of cardiovascular events is related to the severity of the disease which occurs more frequently in patients with large areas of the body affected by psoriasis lesions.[6] Although hyperlipidemia is one of the cardiovascular risk factors, the findings of various studies are not consistent, and some researches even disagree with the role of hyperlipidemia in psoriasis (or the role of cardiovascular disorders in psoriasis).[7–11] This study was designed to investigate the serum lipid profile of patients with various grades of psoriasis.

Materials & Methods

This case-control study was performed on 50 patients with plaque-type psoriasis who fulfilled the criteria of the study and were admitted to the hospital clinics of Mazandaran University of Medical Sciences in 2011. Also, 50 healthy individuals referring with cosmetic complaints, without personal or family history of psoriasis and matched for age and sex were included as the control group. Exclusion criteria for both groups were: diabetes, hypertension, cardiovascular disease, smoking, history of alcohol intake, liver obstructive disease, kidney problems, connective tissue diseases, hypothyroidism, family history of hyperlipidemia, and using lipid lowering drugs, cyclosporine , corticosteroids, β-blockers, thiazide, retinoids and metothrexate. All participants were selected from the Iranian Revolutionary Guards personnel (*Sepah Pasdaran*). They usually had breakfast and lunch at work with a similar diet. Subjects who had high-fat foods at dinner were excluded. After explaining the purpose of the study and obtaining consent letter, data were recorded on questionnaires for each patient. After a 14 h fasting period, 5 mL venous blood was taken in sterile syringe in the morning from all cases and submitted to the laboratory. Serum levels of total cholesterol, triglyceride, LDL, HDL and VLDL were measured by an enzymatic method with standard kits made by Pars Azmun Co. Iran. The severity of psoriasis was evaluated based on the standard criteria of psoriasis

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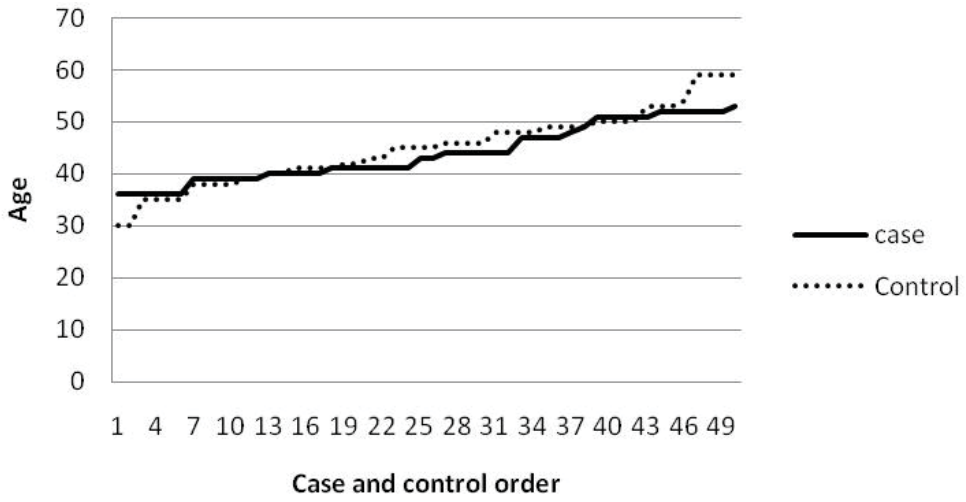

Figure 1. Age distribution of patients and controls

area and severity index (PASI). The clinical severity of the disease was determined according to the PASI score. By estimating the extent of the body surface involvement, scaling in percentage and scoring the erythema, thickening of the affected areas (scalp, trunk, the lower limb and upper limb), the severity of the disease was determined. The collected data were analyzed with student's t-test to assess the difference between the two groups. Logistic regression was used for correlation and multivariate regression was used to investigate the effect of serum lipids level on severity of psoriasis. P values < 0.05 were considered statistically significant.

Results

In this case-control study, 50 psoriatic patients (23 males and 27 females) and 50 normal individuals as the control group (23 males and 27 females) were enrolled for investigation. The mean age of patients and controls was 43.8 and 44.9 years respectively (P`= 0.13). The age distribution of patients and controls is represented graphically in Figure 1. The demographic characteristics of both groups are given in Table 1. In this study, 15% of psoriatic patients had positive family history. PASI scores < 10 were considered mild to moderate and were found in 74% of the patients; PASI scores of 10 – 20 (moderate to severe form) were reported in 14% of the patients; PASI scores > 20 were considered as severe psoriasis and detected in 12% of the patients. Statistically, a significant relationship was observed between the PASI index and serum lipids level (P = 0.008). Abnormal total cholesterol, triglyceride and LDL levels were observed in 57.1% of patients with severe psoriasis. The serum lipid level and lipoproteins in both groups are presented in Table 2. The frequency of abnormal levels of serum cholesterol, triglyceride and LDL in both groups is shown in Table 3. The difference was statistically significant between the two groups (P < 0.0001). Moreover, a statistically insignificant difference was found between disease duration and serum lipids level (P = 0.32).

In the patients group, the serum total cholesterol, triglyceride, VLDL-C and LDL-C were significantly higher than the controls while the HDL-C level was significantly lower (P < 0.05).

Discussion

Coronary atherosclerosis is common and the prevalence is increasing. Disorders mediated by T-helper cytokines, such as psoriasis, are associated with an increased risk of atherosclerosis and cardiovascular events.[12] It seems that the prevalence of cardiovascular events is associated with the severity of the disease and body surface area involvement.[13] One of the causes of cardiovascular diseases in psoriasis patients may be the elevation of plasma lipids and other inflammatory mediators.[14] There are contraindicating reports about the association between serum triglyceride, cholesterol, LDL, VLDL and HDL with psoriasis; the discrepancy goes so far that some studies indicate normal[11,15] higher[13,16,17] or even lower serum triglyceride levels in psoriatic patients.[16] In the present study, the serum triglyceride level was significantly higher in psoriatic patients compared to the controls (P < 0.05). There have been controversial results on serum cholesterol level in pso-

Table 1. Characteristics of patients with psoriasis (n = 50) and controls (n = 50)

	Mean ± SD	Min – Max	*P*-value
Age (years)			0.132
Patients	43.8 ± 5.4	36-53	
Controls	44.9 ± 7.1	30-59	
BMI (Kg/m²)			0.481
Patients	24.4 ± 2.2	20-29	
Controls	23.8 ± 2.3	20-28	
PASI Index			- - -
Patients	7.8 ± 7.2	2-25	
Controls	- - -	- - -	
Duration (years)			- - -
Patients	3.1 ± 1.4	0.5-7	
Controls	- - -	- - -	

Table 2. Lipid profile of psoriatic and controls

	Mean ± SD	Min–Max	*P*-value
Total cholesterol (mg/dL)			< 0.0001
Patients	198.2 ± 18.8	118–224	
Controls	155.9 ± 21.5	93–200	
Triglyceride (mg/dL)			< 0.0001
Patients	156.3 ± 56.1	60–247	
Controls	117 ± 41.8	42–218	
HDL-C (mg/dL)			< 0.0001
Patients	47.6 ± 8.8	37–69	
Controls	53.8 ± 6.6	41–71	
LDL-C (mg/dL)			< 0.0001
Patients	119 ± 18.5	66.6–156.2	
Controls	81.6 ± 24.6	23–187.8	
VLDL-C (mg/dL)			< 0.0001
Patients	31.5 ± 11.1	12–49.4	
Controls	23.4 ± 8.3	8.4–43.6	

Table 3. Frequency of abnormal serum triglyceride, total cholesterol and LDL-C in patients and controls

	Patients		Controls		*P*-value
	Number	Percent	Number	Percent	
Total cholesterol > 200 mg/dL	28/50	56%	1/50	2%	< 0.0001
Triglyceride > 150 mg/dL	32/50	64%	10/50	20%	< 0.0001
LDL-C > 130 mg/dL	16/50	32%	1/50	2%	0.003

riatic patients; different studies report higher,[18] lower[17] or even normal levels.[9,19] Our results indicate significantly higher serum cholesterol levels in psoriatic patients compared to controls ($P < 0.05$). In numerous studies, the serum LDL levels in psoriatic patients are reported normal[20] or higher.[7,9] In our investigation, serum LDL in the case group was higher than the control group. Also in our study, the VLDL level was higher which contrasts the other data that indicate normal range.[17,19] Also, the HDL level was significantly lower than the control group, inconsistent with other studies.[13,17,19] The differences in results of various studies might reflect genetic factors, lifestyle, severity of disease, daily activity and diet in each region. The causes of dyslipidemia (abnormal amount of lipids) in psoriasis may be multiple; the immune mechanisms involving IL-6 and tumor necrosis factor, C-reactive protein, and cellular oxidative stress may be responsible for altered lipid metabolism.[5] From the theoretical point of view, it is established that the skin has the biosynthetic efficiency for metabolizing some lipids. In psoriatic patients with high serum cholesterol, scaling was remarkably higher whereas scaling in psoriasis patients with the free fatty acid was lower.[21] In addition, scaling in the psoriatic patients that occurs at the active phase leads to the depletion of much cholesterol and consequently, stimulates synthesis of more cholesterol.[22] Therefore, the data collected in our investigation confirm the hypothesis that "psoriasis is a systemic disease and not limited to skin".[23] The present study is in marked contrast to the other data indicating a significant relationship between PASI index and elevated serum lipids.[19] This is the first study that has reported significant correlations between PASI index and increased serum lipids. It demonstrates that the patients should implement a proper strategy for reducing the risk of cardiovascular diseases, particularly in patients with higher level of involvement and periodic determination of serum lipids. Early screening of hyperlipidemia and treatment of these patients is highly recommended.

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