Original Article

Studying the Relevance of Psoriasis with Increased Artery Intima–media Thickness, in Patients of Skin Disease Clinics of Kashan Medical Science University in 2016

Rezan Talaee[1], HamidReza Talari[2], Nushin Moussavi[3], Ahmad Yeganeh Moghaddam[4]

[1]Dermatology Department, Faculty of Dermatology, Kashan University of Medical Sciences, [2]Radiology Department, Faculty of Radiology, Kashan University of Medical Sciences, Kashan, [3]Surgery Department, Faculty of Surgery, Kashan University of Medical Sciences, Kashan, [4]ENT Department, Faculty of ENT, Kashan University of Medical Sciences, Kashan, Iran

ORCID:

Rezvan Talaee: https://orcid.org/0000-0002-5383-4987
Hamid Reza Talari: https://orcid.org/0000-0001-6736-8449
Nushin Moussavi: https://orcid.org/0000-0001-8005-9173
Ahmad Yegane Moghaddam: https://orcid.org/0000-0002-8307-2741

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Abstract

Aim: Psoriasis is a prevalent chronic skin disease, and evidence shows that psoriasis is considered as a risk factor for increased cardiovascular diseases. Consequently, this study purpose is an assessment of the relationship between psoriasis and carotid intima–media thickness (CIMT). **Materials and Methods:** The case–control study was conducted on 31 patients developed psoriasis, referred to the skin health-care centers of Kashan in 2016, and 31 healthy controls. Demographic data, disease duration, Psoriasis Area and Severity Index, and Carotid Artery Intima–Media Thickness were measured in each group of patients and compared. Data were entered into SPSS 16 software and analyzed using Chi-square, "Kolmogorov–Simonov" "Leven *t*-test," univariate analysis of variance, and Pearson correlation tests. **Results:** The patients aged in case group was 10 ± 33 and in control group was 10 ± 32. CIMT values were obtained higher in patient group than in control group, but the difference was not significant ($P = 0.44$). CIMT results showed a significant increase in male than female patients ($P = 0.02$). In the present study, no relationship between CIMT and age of disease development and PASI index was observed which indicated the disease severity. **Conclusion:** In this study, according to the Pearson's correlation, a positive correlation was observed between the mean CIMT and age and also duration of the disease in patient group. Any correlation between psoriasis and CIMT and also between the CIMT and age of onset of the disease and PASI score was not found.

Keywords: Carotid artery intima–media thickness, psoriasis, psoriasis severity

Introduction

Psoriasis is a common chronic inflammatory skin disease, generally characterized by red papules erythematous plaques with specific ranges and silvery scales.[1-3] Diseases associated with psoriasis are increasingly being characterized among the patients. The comorbidities mostly associated with psoriasis include metabolic syndromes, cardiovascular, inflammatory bowel disease, and cancer.[4]

Systemic inflammation plays a vital role in atherosclerosis pathogens of psoriasis patients. Chronic skin inflammation in these patients might lead to early atherosclerosis, such as rheumatoid arthritis and systemic lupus erythematous.[5-7] Inflammatory process is associated with psoriasis and also plays a role in the development of atherosclerotic risk factors and

Address for correspondence: Dr. Hamid Reza Talari, Radiology Department, Faculty of Radiology, Kashan University of Medical Sciences, Kashan, Iran.
E-mail: talari2008hr@yahoo.com

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cardiovascular diseases. In terms of histology study, psoriasis and atherosclerosis have common characteristics such as T-cell, monocyte, macrophage, neutrophil, dendritic, and mast cells infiltration. Interleukin-1, IL-6, tumor necrosis factor-α.

Intrinsic antigens introduced into Th-1 and Th-17 cells so caused the inflammatory mechanisms that followed by the IL produced. It seems that these inflammatory mechanisms are responsible for the formation of psoriasis and atherosclerosis plaques.[8,9]

To diagnose the symptomless patients with atherosclerotic disease, one accessible screening method is the measurement of carotid intima–media thickness (CIMT) by high-resolution ultrasonography B-mode technique.[10] CIMT is a noninvasive examination alternative for large artery atherosclerosis which is applied for the early diagnosis of atherosclerotic disease. Ultrasonography is a suitable approach and an alternative noninvasive examination for early diagnose of atherosclerotic patients.[10,11] The increased common carotid artery IMT indicates generalized atherosclerotic.

An extensive observation-based study in Miami State of the U. S conducted on 3226 psoriasis patients and 2500 healthy controls demonstrated that diseases such as cardiovascular, cerebrovascular, and peripheral vascular were more prevalent among psoriasis patients than in healthy controls.[12]

A study on psoriasis patients revealed that psoriasis was an independent risk factor for myocardial infarction.[13] A positive association was found between atherosclerosis and the duration of psoriasis; however, there was no relationship between atherosclerosis and the disease severity.[14]

It should be noticed that in some studies, psoriasis has been challenged as the risk factor of cardiovascular diseases, such as the cohort study conducted in Netherland on 15800 psoriasis patients compared to 27,600 healthy controls, in which no significant difference was reported between the two groups[15] for heart ischemia risks.[15] Another study was also performed on medium severity patients in the Netherlands in 2013 and also demonstrated no association between psoriasis and atherosclerosis.[16]

Cardiovascular risk factor examination is imperative for psoriasis patients. In case of the risk existing, the patients can be persuaded for modifying their lifestyles or balancing risk factors of cardiovascular diseases and regular examinations for early diagnosis and decreased cardiovascular risk factors. Reference to the significance of psoriasis disease and heart ischemia risk and the contradictions about vascular involvements in previous studies by comparing the psoriasis and healthy control subjects, the present study was performed aiming at demonstrating the association between psoriasis and carotid artery media intima thickness in psoriasis patients. In addition, the relationship between psoriasis severity and development duration and carotid artery media–intima thickness was assessed.

Materials and Methods

The case–control study was conducted on 31 psoriasis patients with skin involvements aged from 15 to 60, who did not develop classic risk factors of cardiovascular diseases, referring to skin care centers of Kashan Medical Science University in 2016 and applied for a medical file (the patient group) and 31 healthy controls among the family members or second- or third-degree relatives of the patients aged from 15 to 60, who were in control group. Physical examinations and estimation of disease severity or psoriasis area were performed according to the Psoriasis Area and Severity Index (PASI) score for each patient and supervised by the dermatologist.[17]

Having compared the findings of similar studies in Turkey in 2012[18] and using the presented formulas for the case studies, the number of patients in each group was 19 patients. The maximum CIMT in patient group was 0.86 ± 0.09 mm and in control group was 0.77 ± 0.06 mm ($P < 0.001$). The mean CIMT in patient group was 0.73 ± 0.09 mm and in control group was 0.66 ± 0.06 mm ($P < 0.001$).

Considering the estimated number of psoriasis patients with skin involvement qualified the requirements for participating in the study in Kashan during 2016, the population size was 31 patients for each group. Data collection tools was the author-made checklist containing features such as gender, age, body mass index (BMI), type of psoriasis, age of development, duration of disease, familial history for psoriasis disease, records of the comorbidity systemic diseases, and systemic or topical treatments the patient has already received.[19] Hypertension of each patient was measured 15 min after their rest. The biochemical parameters of the blood (including triglyceride, cholesterol, low-density lipoprotein, high-density lipoprotein, blood urea nitrogen, creatinine, erythrocyte sedimentation rate, fasting blood sugar, white blood cell, hemoglobin, and platelet) were measured for each patient after 10 h of fasting from their venous blood sample and recorded.

The healthy controls were selected among the patient family members or their second- or third-degree relatives who were the age range and gender with them.

The participants then lied down on their back and the ultrasonography assessments were performed for right and left carotid arteries, by a radiologist unaware of the clinical details of the patients, using a Medison V 20 equipped with an 11 MHZ inventor.

For each common carotid artery, two segments were scanned including the balboa region, 10 mm proximal to the balboa. The image focused on the back wall and all the taken diastole images saved digitally for the next analyses.[20] The IMT distance was automatically measured and obtained by the computer software estimating several points on the above-mentioned locations and fell in a reasonable mean range which was at least evaluated in 100 points.[21]

Some factors removed from the study are as follows:

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- Cardiovascular history of patients, pregnancy, smoking cigarette, estrogen, systemic cyclosporine or retinoid treatment, patients or control subjects with cardiovascular risk factors[21] systolic blood pressure <140 mmHg, and diastolic blood pressure <90 mmHg), mellitus diabetes (blood glucose <110 mg/dL), hyperlipidemia (total cholesterol and/or fasting plasma triglyceride <240 mg/dL and <260 mg/dL, respectively), renal failure (serum creatinine <1.3 mg/dL), and obesity (BMI) <30 kg/m^2).[22]

The patients were assured that their personal information will be kept confidential. Their treatment and care would be never faced with any problem and no excess costs would be incurred by the patients.

Data were entered into SPSS 16 software and analyzed by Chi-square, "Kolmogorov–Simonov," "Leven *t*-test," univariate analysis of variance, and Pearson Correlation tests. A significance level of 0.05 was used for α.

Results

The groups were aged between 15 and 60 years and the overall mean and standard deviation obtained was 32.8 ± 9.9 for the two groups. In patient group, the average age of disease development was 20.1 ± 9.9 years and the average duration of disease obtained was 152 ± 100 months and the mean standard deviation of PASI was obtained 16.8 ± 12.5. The details are shown in Tables 1 and 2.

The mean and standard deviation of mean CIMT was obtained in patients and control groups, 0.51 ± 0.06 and 0.49 ± 0.08 mm, respectively. The mean and standard deviation of maximum CIMT was obtained for patients and control groups, 0.59 ± 0.06 and 0.56 ± 0.08 mm, respectively.

As it can be seen from Table 3, the mutual variance test results on the mean CIMT showed that there was no statistically significant difference between mean CIMT results for patients and control groups in view of statistical point (Pv = 0.44).

As it is indicated in Table 3, there was a statistically significant difference between the mean CIMT results for males and females (Pv = 0.026), and CIMT is significantly higher for men than for women.

Furthermore, the counter effect for Pv was not considered as significant for 0.46 (the significant effect between the gender and group (patients and controls)). The statistical data for the maximum CIMT revealed that there was no significant relationship between the maximum CIMT results of the patients and control groups in view of statistical points (Pv = 0.14). Moreover, no significant difference between men and women for the maximum CIMT (Pv = 0.069) was observed and the counter effect amount of Pv = 0.82 was not considered significant (the significance level between the gender and group [patients and controls]) [Table 3].

According Table 4, the Pearson correlation between the mean CIMT and age and disease duration in the case group was significant.

Table 1: Baseline characteristics of the study groups

Characteristics	Patient	Control	*P*
Gender			
Female	21 (48.8)	22 (51.2)	0.72
Male	10 (52.6)	9 (47.4)	
Age	33.03±10.01	32.61±10.08	0.87
BMI	25.4±4.02	26.7±3.4	0.44

BMI: Body mass index

Table 2: Baseline characteristics of the patient group by gender

Characteristics	Female	Male	*P*
Type of psoriasis	Vulgaris	Vulgaris	
Age of development	19.48±11.1	21.7±3.71	0.54
Duration of disease (month)	148.86±95.44	161.1±8.41	0.75
Family history of psoriasis	Negative	Negative	
Comorbidity systemic diseases	Negative	Negative	
History of treatment	Topical	Topical	
PASI score	8.41±9.19	21.28±25.15	0.14

PASI: Psoriasis Area and Severity Index

Table 3: Comparison of mean carotid intima media thickness and maximum mean carotid intima-media thickness between two groups of patients and healthy

Variable	Patient	Control	*P*
Mean CIMT			
Female	0.5±0.05	0.47±0.07	0.026
Male	0.53±0.06	0.53±0.07	
Total	0.51±0.06	0.49±0.08	
P	0.44		0.46
Maximum mean CIMT			
Female	0.58±0.06	0.55±0.09	0.069
Male	0.62±0.07	0.59±0.08	
Total	0.59±0.06	0.56±0.08	
P	0.14		0.82
P			0.44

CIMT: Carotid intima-media thickness

Table 4: The relationship of mean carotid intima-media thickness with age, development age, disease duration, and Psoriasis Area and Severity Index Score for patient group

	Mean CIMT	*P*
Age	0.576	0.001
Disease development age	0.222	0.231
Disease duration	0.447	0.012
PASI score	−0.184	0.322

CIMT: Carotid intima-media thickness, PASI: Psoriasis Area and Severity Index

Furthermore, the Pearson correlation between the mean CIMT and disease development age and PASI score was not significant.

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Discussion

The results showed that CIMT was higher in case group than control group, but this difference was not significant (Pv = 0.44).

Furthermore, CIMT was significantly increased in men compared to women (Pv = 0.026).

There was a positive correlation between the mean CIMT and age in the case group (Pv = 0.001).

There was also a positive correlation between mean CIMT and duration of disease involvement in the case group which was statistically significant ($P = 0.012$).

In this study, no relationship was found between CIMT and age at onset of the disease and the PASI criterion, which represents the severity of the disease.

Given the above, the chronic and systemic inflammation that occurs in psoriasis makes patients susceptible to atherosclerotic diseases, and CIMT is a useful and noninvasive marker for early detection and measurement of atherosclerosis. Different studies are used.

Although at first sight many people thought that psoriasis as an inflammatory disease would be associated with increased CIMT, this study did not support this hypothesis.

In the present study, the association between CIMT and gender, age, and disease duration was confirmed and it was failed for the association between disease development age and PASI.

The cohort study of Balci *et al.* found that there was a significant relation between the mean CIMT findings in the right and left carotid arteries and the mean CIMT values obtained for psoriasis patients compared to healthy control group which was not in consistence with the present study results; also, the relation between disease duration and PASI was failed which was in accordance with the results of our study.[22]

A similar study found a significant association in CIMT results between psoriasis patients and healthy controls (0.9 ± 0.2 mm versus 0.7 ± 0.1 mm, $P < 0.001$) and a positive significant correlation was observed between CIMT results and the patients' age, disease duration, and disease severity. In this study, the findings of the association CIMT results with age and disease duration were in consistence with the present study results.[21]

Altekin *et al.* also reported in their study that the mean and maximum CIMT results were obtained higher for patients group than for the healthy control group ($P < 0.001$). In addition, for patients group, there was a significant association between CIMT results and patient age. As in patients group, no association was found between CIMT results and PASI index and disease duration.[18]

The study of Yiu *et al.* reported that carotid artery atherosclerosis values in patients was measured higher than for the healthy control group (13.64 ± 0.0 versus 0.59 ± 0.07 mm). In this study, there was no independent factor indicating the association CIMT with disease duration and PASI results. The above-mentioned study was performed on 70 psoriasis patients without any cardiovascular disease background and 51 healthy controls who were similar in age and gender to the patient group. Having eliminated the patients with known cardiovascular risk factor background in the two groups, and comparison of CIMT results in patients ($n = 34$) and healthy control ($n = 40$) groups, the CIMT values showed no significant increase in patients group than in control group (0.64 ± 0.13 mm versus 0.59 ± 0.07 mm, $Pv < 0.01$), which is in consistence with the results of the present study.[23]

Conclusion

In this study, no relationship was found between psoriasis and CIMT, as well as no relationship was found between CIMT and disease development age and the PASI criterion (indicating disease severity).

However, the considerable findings indicating the association between CIMT and age or disease duration suggest that despite dismissing the cardiovascular disease risk factors, psoriasis patients are more exposed to atherosclerosis disease compared to healthy controls. Therefore, it is suggested to evaluate the association between other inflammatory factors as well as CPR and nondermal types of psoriasis such as arteritis psoriasis with CIMT value.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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