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Original Article

Psoriasis and subclinical atherosclerosis: A significant association

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Abstract

Objective To identify the presence of subclinical atherosclerosis by measuring carotid intima medial thickness (IMT) in patients with psoriasis attending the dermatology clinic of a tertiary care hospital.

Methods 30 patients who fulfilled the exclusion and inclusion criteria were recruited. 5 healthy persons devoid of known cardiovascular risk factors were registered as controls. Intima medial thickness of common carotid and vertebral arteries of both sides were measured by B mode ultrasound.

Results Result showed that IMT and velocity of left common carotid artery and velocity in right vertebral artery were significantly greater in psoriatic patients than control group and psoriatic patients had 0.8 times greater risk of developing atherosclerosis than control group.

Conclusion Subclinical atherosclerosis remains undiagnosed in patients of psoriasis who usually lack the established risk factors for cardiovascular disease.

Key words
Psoriasis, atherosclerosis, intima medial thickness.

Introduction

Psoriasis is an inflammatory disease which is found to be associated with atherosclerosis. Recent studies showed that systemic inflammation has role in atherosclerosis. Numerous immunological factors which are associated with atherosclerosis also were found to have a role in other systemic inflammatory diseases like rheumatoid arthritis and psoriasis. But the exact mechanism is still to be explained.[1,2]

Many studies have been done to assess the risk of atherosclerosis in rheumatoid arthritis patients but very few studies are present on psoriatic patients.[1] Variable results have been in other studies done on systemic sclerosis and systemic lupus erythematosus.[3,4,5] There is usually a long subclinical lag phase before development of clinical manifestation of cardiovascular diseases which occurs in advanced atherosclerosis. In this latent phase there are functional disturbances and gradual thickening of intima media. So that intima medial thickness (IMT) is used as a sensitive method to detect the atherosclerotic changes in early stage.[6,7] Carotid arteries are usually measured as they are well visualized by ultrasonography.

Hypercholesterolemia, diabetes mellitus, hypertension increase IMT. In healthy persons

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the value of IMT usually remains between 0.25mm and 1.5mm. Hodis *et al*. showed that for each 0.03mm increase in carotid IMT per year the relative risk of nonfatal myocardial infarction and coronary death was 2.2 and relative risk of coronary events was 3.1 (p<0.001). Increased risk of myocardial infarction by 11% was found with increase of IMT by 0.1mm in another study.[7] Besides IMT, echocardiography, coronary arterial calcification measurement showed similar results in patients with psoriatic arthritis.[8]

Carotid IMT is a promising tool to detect subclinical atherosclerosis.Effort has been made to observe whether psoriasis itself is an independent risk factor for atherosclerosis or not.

Methods

It was an analytical cross-sectional study. 30 patients with psoriasis and free from any cardiovascular risk factor were enrolled. Exclusion criteria were presence of diabetes, obesity, hypertension, family history of cardiovascular diseases, smoking, altered blood lipid profile. 5 healthy persons lacking the known cardiovascular risk factors were selected as controls.

Height, weight, waist circumference, blood pressure of patients and control were measured. Fasting and postprandial blood sugar, lipid profile tests were done.

Severity of psoriasis was measured by simple method like measuring the area of involvement. >20% body surface area involvement was the designated mark to start systemic therapy. More accurate procedure to measure the disease activity is Psoriasis Area Severity Index (PASI). The score of PASI usually varies between 0 and 72. PASI score more than 10 was an indicator of severe disease. PASI score of each patient was measured.

High resolution B-mode ultrasonography was used to measure intima medial thickness (IMT) and velocity of both sides common carotid artery, external and internal carotid artery and vertebral artery. Carotid artery was scanned in supine position and 1 cm distal to the carotid bulb. IMT> 1mm was regarded as abnormal.

Data was collected and analyzed. At first data were screened, checked and cleaned. In descriptive phases of analysis both data of cases and control were compared.

Results

Demographic profile showed that control and cases were matched for age and sex (**Table 1**). We found significant correlation between disease duration and velocity in both side vertebral artery. But disease duration and IMT of both sides CCA were not found to correlate significantly (**Table 2**).

Result analysis showed that atherosclerosis and extent of body surface area involvement had positive association (p=0.032), **Table 3**.

Presence of atherosclerosis was found to have significant association with PASI score (p=0.001) and duration of psoriasis (p=0.0001), **Table 4**.

Table 1 Demographic profile in cases and controls.

	Cases	*Controls*	*P value*
Median age (years)	31	37	0.395*
Sex			
Males	18 (60%)	3 (60%)	1.00**

* Mann –Whitney U test, ** Fisher's exact test

Table 2 Correlation between intima medial thickness and velocity with psoriasis severity and duration (Spearman's test).

	CCA (IMT) Right	*CCA (IMT) Left*	*CCA Vel Right*	*CCA Vel Left*	*VA Vel Right*	*VA Vel Left*
PASI	0.083	0.319	0.389	0.356	0.203	0.664
Duration	0.080	0.001	0.391	0.533	0.901	0.672

CCA= Common carotid artery, IMT= Intima medial thickness, PASI= psoriasis area severity index, VA= Vertebral artery, Vel= Velocity,

Table 3 Atherosclerosis and severity of involvement.

BSA<10%	*BSA≥10%*	*P value (Pearson chi-square)*	*Odds ratio (95% CI)*
0	4	0.032	1.364

BSA= Body surface area

Table 4 Atherosclerosis, PASI and duration of psoriasis**.**

	Atherosclerosis Median IQR	*No atherosclerosis Median IQR*	*p value**
PASI	10	3	0.001
Duration	9.50	4	0.0001

* Mann Whitney U test, IQR= Inter quartile range

Table 5 Psoriatic and non-psoriatic comparison of intima medial thickness (IMT) and velocity.

	Psoriatic (median)	*Nonpsoriatic (median)*	*p value**
CCA IMT (Right)	1	1	0.437
CCA IMT (Left)	1	0	0.003
CCA Velocity (Right)	110	77	0.120
CCA Velocity (Left)	107.5	74	0.032
VA Velocity (Right)	40	33	0.011
VA Velocity (Left)	39	37	0.298

* Mann-Whitney U test.

Table 6 Atherosclerosis and psoriasis

Psoriatic (atherosclerosis)	*Non-psoriatic (atherosclerosis)*	*P value (chi-square)*	*Odds ratio*
04	0	0.386	0.867

When comparison was made between psoriatic and non-psoriatic patients, we found that psoriatic patients had greater IMT (p=0.003) and velocity (p=0.032) in left CCA, increased velocity in right vertebral artery (p=0.011), **Table 5**.

Patients with psoriasis had 0.8 times greater risk of developing atherosclerosis than non-psoriatic persons (**Table 6**).

Discussion

Psoriasis is a common and chronic inflammatory disease of skin commonly seen in Caucasian people. Pathogenesis of psoriasis involves some inflammatory mediators which may also have role in atherosclerosis. There are some traditional risk factors of atherosclerosis like diabetes, hypertension, obesity, smoking, altered blood lipid profile. Our study had been designed to see apart from those risk factors whether psoriasis itself is a risk factor for atherosclerosis or not.

To date very few studies have been done to observe the association of subclinical atherosclerosis with psoriasis. But there are many studies present on atherosclerosis and systemic inflammatory diseases like rheumatoid arthritis, psoriatic arthritis, systemic sclerosis.[1,3] The average IMT done by Kimhi *et al*.[9] showed that psoriatic arthritis patients had significantly higher measurement than control (0.76±0.11 versus 0.64±0.27, p<0.00001), as well as, Gonzalez-Juanatey *et*

al.[10] (0.699±0.165 versus 0.643±0.111, $p<$ 0.0031).

Balci *et al.*[11] found significant association between carotid artery IMT and psoriasis. El-Mongy *et al.*[12] observed that patients with psoriasis had increased carotid artery IMT compared with controls (means 0.9±0.2 mm vs. 0.7±0.1 mm; $p<0.001$). Ludwig *et al*.[8] observed increased prevalence (59.4% vs 28.1%, $p=0.015$) and severity of coronary artery calcification in patients with psoriasis.

Cases and control groups were matched for age and sex in our study. In both group 60% patients were male. Median age of cases was 31 and control was 37. Confounding factors like presence of diabetes, obesity, hypertension, history of smoking, altered blood lipid profile were excluded. There is not much correlation between duration and severity of disease and carotid artery intima medial thickness and velocity. But velocity in both vertebral arteries varied significantly with disease duration. Patients with >10% body surface area of involvement had positive association with atherosclerosis ($p=0.032$). Comparison showed that intima medial thickness and velocity of left CCA ($p=0.003$ and 0.032, respectively) and Velocity in right Vertebral artery ($p=0.01$) is significantly greater in psoriatic patients than control group. Psoriatic patients have 0.8 times greater risk of developing atherosclerosis than control group. Previous studies have shown positive correlation.

Limitation of our study was the fact that our patients were from a tertiary care centre which did not demonstrate the true population suffering from psoriasis. Other cardiovascular parameters like echocardiography and serum leptin levels which have good predictive value could not be measured.

Conclusion

Psoriasis, as an inflammatory process contributes to the development of subclinical atherosclerosis. Subclinical atherosclerosis remains undiagnosed in patients of psoriasis who usually lack the established risk factors for cardiovascular disease. Early investigations and routine follow-up by dermatologists and cardiologist may prevent more serious cardiovascular events.

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