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Original Article

Psoriasis and its comorbidities

P.L. Chandravathi, Shruti Dewang, Akhilesh Sharma, Praneet Awake

Department of Dermatology, Venereology and Leprosy, Care Institute of Medical Sciences, Hyderabad, Telangana, India

Abstract

Objective To study the relation between psoriasis and its associated comorbidities i.e. obesity, hypertension, hyperlipidemia, diabetes, thyroid abnormalities.

Methods This was a case-control study, including 150 patients and 50 age- and gender-matched controls visiting dermatology department. Detailed history was taken and clinical examination was done on enrolled patients according to the clinical proforma. Investigations like complete blood picture, thyroid profile, homocysteine levels, lipid profile and fasting blood sugar levels were done.

Results Patients' mean age was 45.56±17.600 years in cases group whereas in control group was 46.060±19.659 years, *P*=0.868. The predominant clinical presentation was of plaque psoriasis. We found an increased prevalence of waist circumference, BMI, hypertension (systolic and diastolic), serum homocysteine and smoking. There was no statistically significant difference in HDL cholesterol, total cholesterol, fasting blood sugar, thyroid stimulating hormone, serum vitamin B12 and alcohol intake, among cases and control group.

Conclusion Psoriasis is associated with numerous comorbidities that have a major impact on patients. In our study, we found significant association with obesity, hypertension, serum homocysteine and increased prevalence of smoking in patients with psoriasis. There are limited number of studies and data in Indian population for co-morbidities in psoriasis and much more studies and research are required to study such associations in Indian population.

Key words
Comorbidity, metabolic syndrome, psoriasis.

Introduction

Psoriasis is a common, immune-mediated, multifactorial disease characterized by phenotypic diversity and genetic heterogeneity. The condition was first described by Celsus (25 BC-50 AD), a Roman scholar who referred to psoriasis as "impeto".[1] Psoriasis is a polygenic disease and various triggering factors, e.g. trauma, infections or medications, may elicit a psoriatic phenotype in predisposed individuals.

Address for correspondence
Dr. P. L. Chandravathi,
Department of Dermatology,
Care Hospital, Road No. 10, Banjara Hills,
Hyderabad-500 034, Telangana, India
Email: plchandra@gmail.com

The impact of psoriasis on quality of life is significant given its chronicity and prevalence (up to 2% of the population).[2]

Epidemiological research has shown that hypertension, heart failure and diabetes are significantly more common in patients with psoriasis than in controls.[3] These associations between psoriasis and comorbidities, may be related to their chronic and inflammatory nature, especially due to increased proinflammatory cytokines that are part of the pathophysiology of such disorders.[4,5] Similarities also exist among psoriasis, the metabolic syndrome and atherosclerosis, with all three conditions characterized by an inflammatory process driven by Th1 cytokines.[6,7]

Results of epidemiological reports and studies investigating the association with comorbidities vary depending on the population studied. This study was designed to define the epidemiological, clinical, and laboratory profile of patients seen at our hospital and to investigate the association with comorbidities and psoriasis.

Methods

A total of 150 consecutive psoriatic patients fulfilling the inclusion criteria of age group 10 to 90 years and 50 age- and gender-matched controls having minor skin ailments were included attending our outpatient department at CARE Institute of Medical Sciences during 2 years were included in the study after obtaining consent from the patient and ethical committee approval.

Inclusion criteria for study population were: all patients with clinically diagnosed and biopsy-proven psoriasis of any morphological and clinical variant, belonging to both sexes and aged 10 to 90 years. Patients of psoriasis of less than 1 month, on already systemic steroids for more than three months or having comorbidities diagnosed prior to onset of psoriasis were excluded. Patients suffering from other skin diseases of either sex and aged 10 to 90 years were taken as controls provided they did not have family history of psoriasis.

Study population was divided in different groups according to age: 10 to 29 years (early age), 30 to 45 years (early middle age), 46 to 60 years (middle age) and 61 to 90 years (old age). Detailed history was taken and clinical examination was done. Medical history of any concurrent diseases was obtained. Active screening for other diseases was performed only if clinically indicated. Psoriatic arthropathy and psoriatic nail disease were considered as clinical manifestations of psoriasis and not as comorbidities.

Detailed medical history and examination of the patients with particular emphasis on the onset, distribution, and nature of psoriasis was carried out. History of smoking and alcohol intake was specifically looked for along with known history of other medical ailments. Duration and number of cigarette packs per day, type and duration of alcohol intake and details of medications were noted.

Central obesity was measured in every patient according to American Heart Association/National Heart Lung Blood Institute modified ATP111 2005 for Asians criteria i.e. ≥90 cm in Asian men and ≥80 cm in Asian women. Definition of obesity was based on WHO-WPR 2000 criteria for Asians: normal BMI = 18.5-23 kg/m^2, overweight ≥23 kg/m^2 and obese ≥ 25 kg/m^2.

Systolic and diastolic blood pressured was measured in every patient. High blood pressure was said to be present if it was persistently at or above 140/90 mmHg. Complete blood picture, liver function test, serum homocysteine, lipid profile (fasting), random blood sugar, serum creatinine, vitamin B12, thyroid profile were performed for all the patients.

Statistics

Statistical software named Window stat version 9.2 from Indostat services was used. Student t test and chi-square test were done to study significance of study parameters and *p* value of <0.05 was considered to be significant. Charts, graphs, tables were prepared using Microsoft Excel 2007 version.

Results

Study population included 150 patients of which

96 patients were Indian males and patients were 54 Indian females and 50 healthy Indian patients without psoriasis attending our dermatology OPD and satisfying our inclusion and exclusion criteria.

The age distribution of the study population was between 10 to 83 years. The mean age in the cases group was 45.56±17.600 years whereas in control group was 46.060±19.659 years (p=0.868). Maximum number of patients was distributed in the age group between 45 to 50 years (n=22, 14.7%) after that age group 25 to 30 (n=19, 12.7%).

The total number of males in study was 124 (62%) and total number of females was 76 (38%), p=0.313.

Table 1 Age and sex distribution of study population and controls.

	Cases (n=150)	*Controls (n=50)*
Age (years)		
10-20	16 (10.7%)	5 (10%)
21-30	27 (18%)	12 (24%)
31-40	27 (18%)	7 (14%)
41-50	30 (20%)	7 (14%)
51-60	16 (10.7%)	7 (14%)
61-70	25 (16.6%)	5 (10%)
71-80	9 (6%)	6 (12%)
81-90	-	1 (2%)
Sex		
Male	96 (64%)	28 (56%)
Female	54 (36%)	22 (44%)

Table 2 shows the frequency of smoking and alcohol intake in the study population. We found that 30 (20%) out of 150 cases having positive smoking history and 3 (6%) out of 50 controls having positive smoking history (p=0.021). Similarly, 20 (13.3%) out of 150 cases were had positive history of alcohol intake and 9 (18%) out of 50 controls had positive alcohol intake history (p=0.417).

Table 2 Frequency of smoking in the study population and controls.

	Cases (n=150)	Controls (n=50)
Smoking		
Present	30 (20%)	3 (6%)
Absent	120 (80%)	47 (84%)
Alcohol intake		
Present	20 (13.3%)	9 (18%)
Absent	130 (86.7%)	41 (82%)

Evaluation of other comorbidities in psoriasis showed that among patients, there was statistically significant difference regarding mean values of waist circumference (p<0.041), BMI (p<0.044), blood pressure (both systolic and diastolic) (p<0.036) between cases and controls. The difference between mean values of fasting blood sugar, thyroid profile, serum B12 and complete blood picture was not statistically significant between cases and controls.

Table 3 Distribution of anthropometric, blood pressure and laboratory parameters between two groups in patients

Parameters	*Cases*	*Control*	*P value*
Waist circumference (cm)	95.207±3.033	87.080±4.039	0.041*
Body mass index (kg/m^2)	28.440±4.075	23.160±3.078	0.044*
Systolic blood pressure (mmHg)	129.427±1.177	124.400±1.475	0.024*
Diastolic blood pressure (mmHg)	84.733±0.597	81.960±0.692	0.013*
Serum triglyceride levels (mg/dl)	146.260±1.056	144.140±1.533	0.298
Serum HDL (mg/dl)	37.267±0.478	38.880±0.508	0.068
Serum cholesterol (mg/dl)	211.127±1.915	208.260±3.022	0.445
Fasting blood sugar (g/dl)	100.040±2.279	92.480±2.325	0.072
Serum TSH level (U/ml)	4.642±0.270	4.356±0.336	0.573
Serum B12 level (pmol/L)	0.527±0.041	0.380±0.069	0.073
Serum homocysteine level (µmol/L)	13.147±0.432	11.120±0.527	0.013*

* significant p value

There was statistically significant difference between mean values of serum homocysteine (p<0.013) between cases and controls. However, differences between mean values of TG, HDL and cholesterol were not significant between cases and controls.

Discussion

Psoriasis is associated with numerous comorbidities that have a major impact on severely affected patients. Comorbid conditions linked with psoriasis are associated with increasing rates of morbidity and mortality.[8] Besides psoriatic arthritis, other diseases such as metabolic syndrome and cardiovascular diseases have emerged as important comorbidities. The relationship between psoriasis and comorbidities is likely linked to the underlying chronic inflammatory nature of psoriasis.[9]

The age distribution of the study population was between 10 to 83 years. The mean age in the cases group was 45.56. Maximum number of patients was distributed in the age group between 45 to 50 years followed by age group 25 to 30. The total number of males in study was 124 (62%) and females patients were 76 (38%), p=0.313.

Table 4 compares the results of some of the previous studies. Thus in our study we found the significant difference between smoking, waist circumference, BMI, hypertension and serum homocysteine. The prevalence rate for these variables were significantly higher in our study. Our studies results are similar to Krueger *et al.*[9] and Cohen *et al.*[10] but was not similar to the studies conducted by Naldi *et al.*[4]

There was no statistically significant difference in alcohol intake, HDL cholesterol, total cholesterol, fasting blood sugar, thyroid stimulating hormone and serum B12 level among cases and control group. Results of our

Table Comparison of studies showing association of psoriasis with its co-morbidities

Study	*Year*	*No. of patients*	*WC*	*B.M.I*	*HTN*	*Lipid profile*	*BS-F*	*TSH*	*S. B12*	*S. homo-cysteine*	*Smoking*	*Alcohol*
Naldi *et al.*[4]	2005	560	NE	0.01 (S)	NE	NE	NE	NE	NE	NE	NE	NS
Herron *et al.*[10]	2005	1998	<0.01	NE	NE	NE	NE	NE	NE	NE	<0.01	NE
Neimann *et al.*[11]	2006	133560	0.01 (S)	NE	0.01 (S)	NE	0.01 (S)	NE	NE	NE	0.01 (S)	NE
Cohen *et al.*[12]	2007	340	NE	NS	NS	NS	<0.01 (S)	NE	NE	NE	NE	NE
Altobelli *et al.*[13]	2009	1954	NS	NE	0.01 (S)	NE	NS	NE	NE	NE	NE	NE
Cakmak *et al.*[14]	2009	70	NE	NE	NE	NE	NE	NE	NS	<0.05 (S)	NE	NE
Choi *et al.*[15]	2010	197	NE	0.01 (S)	0.04 (S)	0.021 (S)	NE	NE	NE	NE	NE	NE
Qureshi *et al.*[16]	2010	1060	NE	NE	NE	NE	NE	NE	NE	NE	NE	<0.01 (S)
Prey *et al.*[17]	2010	NE	NE	0.05 (S)	NS	NS	NS	NE	NE	NE	NE	NE
Malekzad *et al.*[18]	2011	30	NE	NS	0.001 (S)	0.014 (S)	0.044 (S)	NE	NE	NE	NE	NE
Tobin *et al.*[19]	2011	20	NE	<0.004(S)	<0.001 (S)	NE	NE	NE	NE	<0.007 (S)	NE	NE
Malhotra *et al.*[20]	2011	50	NE	NE	NE	NE	NE	0.045 (S)	0.001 (S)	NE	NE	NE
Mazlin *et al.*[21]	2012	2267	NE	NE	<0.028 (S)	NS	<0.038	NE	NE	NE	NE	NE
Kumar *et al.*[22]	2012	200	NE	NS	<0.046	NE	<0.056 (NS)	NE	NE	NE	NE	NE
Madanagobalane and Anandan[23]	2012	118	0.035 (S)	NE	NS	<0.011	NS	NE	NE	NE	NE	NE
Our study	2016	150	0.021 (S)	0.044 (S)	0.036 (S)	0.298 (NS)	0.072 (NS)	0.573 NS	0.073 (NS)	0.013 (S)	0.021 (NS)	0.417 (NS)

NS: not significant, S-significant association, NE -not evaluated
BMI=body mass index; BS-F=blood sugar fasting; HTN= hypertension; TSH=thyroid stimulating hormone; WC=waist circumference.

study are similar to that reported by previous researchers; nonetheless, different studies were based on different populations.[4,10-23]

The common pathogenesis of psoriasis and metabolic syndrome might explain this association. Both are T helper type 1 (Th1) cells-mediated disorders. Th1 proinflammatory mediators (TNF-∞, IL-6) overexpressed in psoriasis lead to development of different components of metabolic syndrome.[20]

Conclusion

In our study we found significant association with obesity, hypertension, serum homocysteine and increased prevalence of smoking in patients with psoriasis.

All these comorbidities points towards increased risk of cardiovascular involvement and metabolic syndrome. Therefore, it should be noted that the approach of the psoriatic patient should be comprehensive and multidisciplinary to implement preventive and early therapeutic measures aiming to improve the rates of mortality, hospitalization, and survival.

References

1. Lal S. Clinical pattern of psoriasis in Punjab. *Indian J Dermatol Venereol*. 1966;**35**:5-12.
2. Monk BE, Neill SM. Alcohol consumption and psoriasis. *Dermatologica.* 1986;**173**:57-60.
3. Poikolainen K, Reunala T, Karvonen J, Lauharanta J, Kärkkäinen P. Alcohol intake: a risk factor for psoriasis in young and middle aged men? *BMJ.* 1990;**300**:780-3.
4. Naldi L, Chatenoud L, Linder D, Belloni Fortina A, Peserico A, Virgili AR *et al*. Cigarette smoking, body mass index, and stressful life events as risk factors for psoriasis: results from an Italian case-control study. *J Invest Dermatol.* 2005;**125**:61-7.
5. Ryder MI, Saghizadeh M, Ding Y, Nguyen N, Soskolne A. Effects of tobacco smoke on the secretion of interleukin-1beta, tumor necrosis factor-alpha, and transforming growth factor-beta from peripheral blood mononuclear cells. *Oral Microbiol Immunol.* 2002;**17**:331-6.
6. Okubo Y, Koga M. Peripheral blood monocytes in psoriatic patients overproduce cytokines. *J Dermatol Sci.* 1998;**17**:223-32.
7. Flisiak I, Chodynicka B, Porebski P, Flisiak R. Association between psoriasis severity and trans-forming growth factor beta (1) and beta (2) in plasma and scales from psoriatic lesions. *Cytokine*. 2002;**19**:121-5.
8. Gelfand JM, Troxel AB, Lewis JD, Kurd SK, Shin DB, Wang X *et al*. The risk of mortality in patients with psoriasis: results from a population based study. *Arch Dermatol*. 2007;**143**:1493-9.
9. Krueger G, Ellis CN. Psoriasis - recent advances in understanding its pathogenesis and treatment. *J Am Acad Dermatol*. 2005;**53**:S94-100.
10. Herron MD, Hinckley M, Hoffman MS. Impact of obesity and smoking on psoriasis presentation and management. *Arch Dermatol*. 2005:**141**:1527-34.
11. Neimann AL, Shin DB, Wang X, David J. Margolis DJ, Troxel AB, Gelfand JM *et al*. Prevalence of cardiovascular risk factors in patients with psoriasis. *J Am Acad Dermatol*. 2006;**55**:829-35.
12. Cohen AD, Gilutz H, Henkin Y, Zahger D, Shapiro J, Bonneh DY *et al.* Psoriasis and the metabolic syndrome. *Acta Derm Venereol*. 2007:**87**:506-9.
13. Altobelli E, Petrocelli R, Macaronne M, Altomere G, Argen-Jiano G, Giannettie A *et al*. Risk factors of hypertension, diabetes and obesity in Italian psoriasis patients: a survey on socio-demographic characteristics, smoking habits and alcohol consumption. *Eur J Dermatol*. 2009;**19**: 252-6.
14. Cakmak SK, Gül U, Kiliç C, Gönül M, Soylu S, Kiliç A. Homocysteine, vitamin B12 and folic acid levels in psoriasis patients. *J Eur Acad Dermatol Venereol*. 2009;**23**:300-3.
15. Choi WJ, Park EJ, Kwon IH, Kim KH, Kim KJ. Association between psoriasis and cardiovascular risk factors in Korean patients. *Ann Dermatol*. 2010;**22**:300-6.
16. Qureshi AA, Dominguez PL, Choi HK, Han J, Curhan G. Alcohol intake and risk of incident psoriasis in US women. *Arch Dermatol.* 2010;**146**:1364-9.

17. Prey S, Paul C, Bronsard V, Puzenat E, Gourraud PA, Aractingi S *et al*. Cardiovascular risk factors in patients with plaque psoriasis: a systematic review of epidemiological studies. *J Eur Acad Dermatol Venereol.* 2010;**24** Suppl 2:23-30.
18. Malekzad F, Robati R, Abaei H, Hejazi S, Ayatollahi A, Younespour S. Insulin resistance in psoriasis: A case-control study. *Iran J Dermatol.* 2011;**14**:136-9.
19. Tobin AM, Hughes R, Hand EB, Leong T, Graham IM, Kirby B. Homocysteine status and cardiovascular risk factors in patients with psoriasis: a case-control study. *Clin Exp Dermatol*. 2011;**36**:19-23.
20. Malhotra SK, Dhaliwal GS, Puri KJPS, Gambhir ML, Mahajan M. An insight into relationship between psoriasis and metabolic syndrome. *Egypt Dermatol Online J*. 2011;**7**:2:5: 1-12.
21. Mazlin MB, Chang CC, Baba R. Comorbidities associated with psoriasis – data from the Malaysian Psoriasis Registry. *Med J Malaysia*. 2012;**67**:518-21.
22. Kumar P, Thomas J. Comorbid conditions in psoriasis – Higher frequency in females: A prospective study. *Indian Dermatol Online J*. 2012;**3**(2):105-8.
23. Madanagobalane S, Anandan S. Prevalence of metabolic syndrome in South Indian patients with psoriasis vulgaris and the relation between disease severity and metabolic syndrome: A hospital-based case-control study. *Indian J Dermatol*. 2012;**57**:353-7.