Psoriasis and Its Association with Various Biochemical Parameters - A Clinico-Epidemiological Study

Bhagya Rekha Manchiryala[1], Usha Rani Tirupathi[2], Anand T.[3]

[1]Department of DVL, Kakatiya Medical College, Warangal, Telangana, India. [2]Department of DVL, Kakatiya Medical College, Warangal, Telangana, India. [3]Department of DVL, Kakatiya Medical College, Warangal, Telangana, India.

ABSTRACT

BACKGROUND

Psoriasis is a chronic, genetically determined, inflammatory and proliferative disease of the skin and joints. It is associated with several co-morbidities including psoriatic arthritis, decreased quality of life, depression, increased cardiovascular risk, type 2 diabetes mellitus, hypertension, metabolic syndrome, cancer and Crohn's disease. Patients with metabolic syndrome are at a significantly increased risk of developing cardiovascular morbidity and mortality. Increased rates of depression in patients with psoriasis may be another factor leading to increased risk of cardiovascular disease.

METHODS

The study was conducted among 100 cases of psoriasis of either sex attending Dermatology, Venereology, Leprosy OPD at MGM Hospital, Warangal, during the period of January 2015 to June 2016.

RESULTS

A total of 100 cases of psoriasis and 100 age and sex matched controls were recruited. Detailed history, thorough physical & clinical examination and lab investigations were carried out. The severity of psoriasis was assessed using the PASI score. The results obtained have been depicted in tabular and graph format. Statistical analysis of the cases and controls was carried out.

CONCLUSIONS

The present study concluded that psoriatic patients were not at any increased risk of cardiovascular co-morbidities as we did not note any significant correlation between the derangements of lipid parameters and occurrence of co-existent diabetes or hypertension. Another important conclusion deducted from the present study was that there was no discrepancy in the parameters of lipid profile with the severity of psoriasis.

KEY WORDS

Metabolic Syndrome, Serum Uric Acid, Lipid Profile, Psoriatic Arthritis

Corresponding Author:
Bhagya Rekha Manchiryala,
H. No. 6-2-83, Kakaji Colony,
Hanamkonda, Warangal,
Telangana, India.
E-mail: dr.sbrekha@gmail.com

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BACKGROUND

Psoriasis is a chronic, inflammatory and proliferative condition of the skin, in which both genetic and environmental influences have a critical role.[1] The aetiology of psoriasis is unknown but genetic, metabolic and immunological mechanisms have been proposed. Activated T-cells are believed to be the primary modulators in the pathogenesis of psoriasis.[2,3] It is characterized by chronic, sharply demarcated dull-red, scaly plaques, particularly on the extensor prominences and the scalp. It has a bimodal distribution of age of onset being most common in the second to fourth decade of life[1]. Several studies confirm that psoriasis worsen in winter and improves in summer.[1] Psoriasis is associated with several co-morbidities including decreased quality of life, increased cardiovascular risk, type-2 diabetes mellitus, hypertension, metabolic syndrome, cancer and Crohn's disease.[4,5] It has been suggested that psoriasis is associated with metabolic syndrome, but there have been very few studies on the association between psoriasis and diabetes. As diabetes is an independent risk factor for the development of cardiovascular disease,[6] its association with psoriasis is of importance.

Elevated serum uric acid levels are a frequent finding in psoriasis. It seems a convincing idea that the rapid epidermal turnover in psoriasis might lead to an increased purine breakdown and may thus influence the serum uric acid levels.[7] Many studies of the past have especially identified a direct association between serum uric acid levels and psoriatic arthropathy. Scaling from the surface of the lesion in psoriasis may be related to lipid disorders in the epidermis and in the serum.[8] Serum lipid level abnormalities may be the reason for increased risk of atherosclerosis in psoriasis.[9] Evidence suggests that chronic inflammation, a characteristic feature of psoriasis, per se may play a role in the initiation and progress of dyslipidaemia and atherosclerosis.

Diagnosis of psoriasis is usually made on clinical grounds alone and rarely requires a skin biopsy. Psoriasis Area Severity Index (PASI) is a useful tool for monitoring the response of psoriasis to any therapeutic regimen.[1] This system provides an objective tool for the evaluation of psoriasis. Psoriasis is usually a lifelong disease with variable periods of spontaneous remissions and exacerbations. However, the course and progress in a particular patient are unpredictable. The present study is done to know further about the clinical and epidemiological profile of the disease and to assess its collaboration with lipid profile, diabetes status which in turn act as risk factors for cardiovascular disease in these patients. Further correlation of serum uric acid levels with severity of the disease is assessed.

METHODS

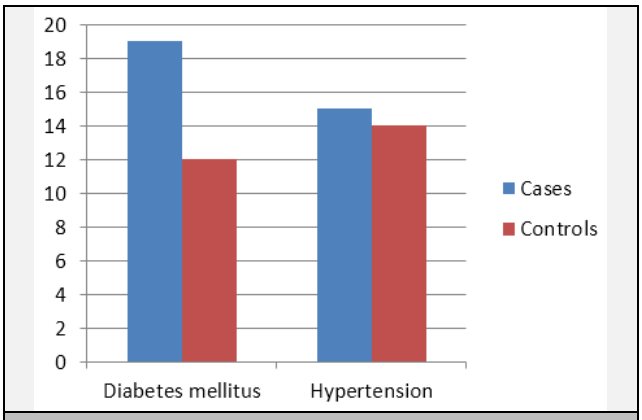
The present study comprised of 100 newly diagnosed cases of psoriasis of either sex visiting OPD of MGM Hospital, Warangal during the period of January 2015 to June 2016 (18 months). This was a cross-sectional study with purposive sampling. Newly diagnosed cases of psoriasis who haven't started either topical or systemic treatment for psoriasis are only included for the study as they may interfere with lipid profile or blood sugars or serum uric acid levels. After obtaining informed consent, detailed history was taken, and thorough clinical examination was carried out and the clinical data was recorded as per the proforma. The available case records were scrutinized to collect any information regarding pre-existing illnesses. Routine haematological investigations like fasting blood sugar, fasting lipid profile, serum uric acid levels were carried out by taking 10 ml venous blood from all pupil. Supine blood pressure of all patients was recorded. PASI (Psoriasis Area Severity Index) scoring was done on all the patients and were categorized into mild, moderate and severe. PASI <3 as mild, 3-10 as moderate, >10 as severe.

Statistical analysis was carried out using ANOVA (Analysis of Variance), Chi-square/2x3 Fisher Exact test to find the relevance of study parameters on categorical scale.

RESULTS

Out of 100 cases that were selected for the study, 71 were males and 29 were females. The ratio of males and females in our study is 2.4:1 and controls are 2.2:1. The distribution of age in our study ranged from 18-75 years. Maximum number of patients belonged to age group of 41-50 years (28%) whereas it was only 3% in 13-20 years and 2% in 71-80 years. Based on PASI, severity of psoriasis was mild in 3%, moderate in 55% and severe in 42% of cases. Of the 100 patients that were selected for the study, 12 patients had psoriatic arthritis and 88% of the patients did not show any joint involvement. Diabetes mellitus was seen in 19% of the cases while in controls it was 12%. This was not a statistically relevant association. (p value: 0.171). Hypertension was noted in 15% of the cases while in controls it was 14%. This was not a statistically considerable association. (p value: 0.8408).

20% of patients had elevated serum uric acid levels while 17% of the controls showed elevated levels of serum uric acid. Thus, no association was found between increase in uric acid levels and psoriasis (p value: 0.584). Further, the association between the prevalence of diabetes and abnormalities in the lipid parameters, prevalence of hypertension and abnormalities in lipid parameters was not found to be statistically significant. There was no association noted between the fasting blood glucose level and severity of psoriasis (p value: 0.403).



Graph 1. Diabetes Mellitus and Hypertension in Cases and Controls

Psoriatic Arthritis	No. of Patients (n=100)	Serum Uric Acid <6.0 mg/dL	Serum Uric Acid >6.0 mg/dL
Yes	12	11 (91.66%)	1 (8.33%)
No	88	70 (79.54%)	18 (20.45%)
Total	100	83 (83.0%)	17 (17.0%)

Table 1. Variation of Uric Acid Levels with Prevalence of Psoriatic Arthritis

Lipid Parameters	Criteria	Cases (n=100)	Controls (n=100)	p
Total cholesterol	<225 mg/dL	89 (89.0%)	91 (91.0%)	0.637
	>225 mg/dL	11 (11.0%)	9 (9.0%)	
Serum Triglycerides	<170 mg/dL	53 (53.0%)	64 (64.0%)	0.114
	>170 mg/dL	47 (47.0%)	36 (36.0%)	
HDL	<35 mg/dL	21 (21.0%)	25 (25.0%)	0.501
	>35 mg/dL	79 (79.0%)	75 (75.0%)	
VLDL	<40 mg/dL	63 (63.0%)	66 (66.0%)	0.726
	>40 mg/dL	37 (37.0%)	34 (34.0%)	
LDL	<150 mg/dL	89 (89.0%)	92 (92.0%)	0.469
	>150 mg/dL	11 (11.0%)	8 (8.0%)	

Table 2. Lipid Profile in Cases and Controls

Lipid Parameters	Criteria	Cases (n=100)	Controls (n=100)	p
Total cholesterol	<225 mg/dL	89 (89.0%)	91 (91.0%)	0.637
	>225 mg/dL	11 (11.0%)	9 (9.0%)	
Serum Triglycerides	<170 mg/dL	53 (53.0%)	64 (64.0%)	0.114
	>170 mg/dL	47 (47.0%)	36 (36.0%)	
HDL	<35 mg/dL	21 (21.0%)	25 (25.0%)	0.501
	>35 mg/dL	79 (79.0%)	75 (75.0%)	
VLDL	<40 mg/dL	63 (63.0%)	66 (66.0%)	0.726
	>40 mg/dL	37 (37.0%)	34 (34.0%)	
LDL	<150 mg/dL	89 (89.0%)	92 (92.0%)	0.469
	>150 mg/dL	11 (11.0%)	8 (8.0%)	
Serum Uric Acid	<6.0 mg/dL	80 (80.0%)	83 (83.0%)	0.584
	>6.0 mg/dL	20 (20.0%)	17 (17.0%)	
Hypertension	>130/90 mm of Hg	15 (15.0%)	14 (14.0%)	0.8408
diabetes mellitus	>100 mg/dL	19 (19.0%)	12 (12.0%)	0.171

Table 3. Various Parameters in Cases and Controls

Variables	PASI Mild	PASI Moderate	PASI Severe	p
Age in years	36.00±6.56	44.82±12.33	40.74±13.86	0.203
FBS (mg/dL)	87.33±7.57	92.31±20.12	96.76±22.22	0.498
Total cholesterol (mg/dL)	181.00±43.00	180.42±35.87	187.11±39.80	0.684
Triglycerides (mg/dL)	254.00±168.02	191.69±92.21	172.69±91.02	0.275
HDL (mg/dL)	38.67±5.51	39.07±6.37	38.92±7.06	0.991
VLDL (mg/dL)	53.33±30.99	36.89±16.51	32.66±13.74	0.069+
LDL (mg/dL)	88.00±16.46	104.84±25.56	113.78±33.42	0.161
Uric acid (mg/dL)	5.17±1.06	5.08±1.11	4.81±1.24	0.511

Table 4. Comparison of Prevalence of diabetes Mellitus, Abnormal Lipid Profile and Abnormal Uric Acid According to Different Levels of PASI Scores

DISCUSSION

Psoriasis is a paradigm of a chronic and relapsing inflammatory skin disease which so far was supposed to be restricted to the skin with the exception of Psoriatic arthritis. The systemic inflammation present in psoriasis, various systemic treatments for psoriasis and an increased prevalence of unhealthy lifestyle factors may all contribute to this unfavourable cardiovascular risk profile. This study was undertaken to study one such debatable association-association with abnormalities in lipid profile, blood glucose levels and prevalence of hypertension which collectively constitute the so-called metabolic syndrome. A raised male preponderance was noted in our study with 71 male and 29 female patients with a male to female ratio of 2.4:1, which is in accordance with the findings noted in other published studies.[10, 11, 12] the ratio in controls was 2.2:1. Psoriasis was noted predominantly (28%) in the age group of 41-50 years. In our study, 3% patients had mild psoriasis (PASI<3), 55% of patients had psoriasis of moderate severity (PASI 3-10) whereas 42% had severe type (PASI>10). Thus, 58% of patients found to have PASI score less than 10, which show resemblance with other studies. Rao et al revealed PASI ranged from 0.5-30 (mean- 10.22).[13] Psoriatic arthropathy was noted in 12 of our patient's i.e., 12%. Prasad et al,[14] Bedi et al[11] and Kumar et al[15] in their study on Indian patients showed prevalence of psoriatic arthritis to be 8.47%, 10% and 8.7% respectively. Thus, our findings correlated with those of the above studies.

diabetes Mellitus

In our study 19% of the cases were diabetic while only 12% of the controls had diabetes mellitus with a p-value 0.171. These findings were congruent with the studies done by Alexander et al,[16] Sundaram[17] on Indian patients. However, certain authors from Western countries reported contradictory finding. Niemann et al,[18] Sommer et al,[19] Shapiro et al[20] and Cohen et al have all noted a rise in the occurrence of diabetes in patients with psoriasis. The distribution of diabetes in psoriasis patients according to the severity of disease was as follows: mild disease (0%), moderate disease (14.5%) and severe disease (23.8%). There was no statistically significant correlation noted between the prevalence of diabetes mellitus and the severity of the disease (p value-0.403). Lee et al[21] revealed a mild disease in 10.5% and severe disease in 18.2% of cases.

Uric Acid Levels

Increased levels of uric acid were found in 20% of psoriasis patients while in controls, mildly increased levels were seen in 17% patients. The mean value of uric acid in cases was 4.97 mg/dL while the mean value in controls was 4.67 mg/dL. This association was found to be of suggestive significance (p value-0.078). Jain et al revealed a mean value of uric acid in cases as 7.0 mg/dL when compared to controls as 4.1 mg/dL. Our results were consistent with those of Lambert and Wright[22] who found a high prevalence of serum uric acid values above normal, but a mean value inside the normal range. The study on Indian patients by Prasad et al[14] revealed an increase in serum uric acid levels in 45% of the patients. However, the mean values were within the normal range. A study of 132 psoriatic patients in India by Vermaet al[23] revealed that high serum uric acid levels were present in 26.6% of the patients.

Uric acid Levels with PASI

The mean value of uric acid in patients with mild, moderate and severe disease was 5.17, 5.08 and 4.81 mg/dL respectively. In our study, no significant association was found between the severity of psoriasis and the levels of uric acid (p value-0.511). This was consistent with the study of 50 psoriatic patients by Ramesh Chand et al,[24] where they found that 7 patients had elevated serum uric acid levels without any relation to the extent of skin involvement. Another study by Brenner et al also concluded that there is no relationship between the frequency of hyperuricemia and the extent of psoriatic skin involvement.

Uric Acid Levels with Psoriatic Arthritis

Amongst patients with psoriatic arthritis, 91.66% revealed a normal level of uric acid. Thus, psoriatic arthritis was not

significantly associated with increase in levels of uric acid (p value-0.315). These findings were consistent with that of Anuja et al,[25] on Indian patients, similar results were also noted by Lambert and Wright[22] in their study on western patients.

Hypertension

In the present study, prevalence of hypertension in psoriatic patients was 15% and in controls was 14%. Thus, indicating no statistically significant correlation with a p-value of 0.8408. However, no correlation was noted between severity of the disease and the prevalence of hypertension (p value-0.385). Our findings were compatible with that of Alexander et al[16] on Indian patients which showed a prevalence of hypertension in 8.1% of psoriasis patients. This however was in contrast to many studies published in western literature. Cohen et al[20] reported significantly high prevalence of hypertension in psoriasis patients than controls (38.8% and 29.1% respectively).

Lipid Levels

In the present study, 89% of the cases of psoriasis had normal levels of serum cholesterol as compared to 91% of controls. Hence, the difference in the cholesterol levels between cases and control were not statistically significant (p value-0.637). In a study done by Sunitha et al,[26] mean cholesterol levels in cases was 160.38 mg/dL when compared to controls as 145.33 mg/dL (p value-0.02). Whereas in studies by Mallbris et al.[27] Rocha-Pereira et al,[28] and Piskin et al,[29] total serum cholesterol levels were elevated. The mean value of serum triglycerides in cases was 185.58 which was considerably higher than the mean value in controls which was 149.46 (p value<0.001). Also, in studies by Rocha-Pereira et al., Javidi et al., noted elevated levels of serum triglycerides. The cases and controls showed a mean value of HDL as 39.00 and 39.68 respectively, thus representing no statistically significant association (p value-0.707).These results were congruent with that of Piskin et al. The cases and controls showed a mean value of VLDL as 35.63 and 33.83 respectively, thus showing no statistically significant equivalence between cases and controls (p value-0.339). Mean LDL values in cases was 108.03 while in controls was 114.41. This alliance was not found to be statistically remarkable (p value-0.097). These results were in accordance with the studies of Rocha-Pereira et al, Uyanik.[30]

CONCLUSIONS

Recent review of literature suggests an association of metabolic syndrome with psoriasis. Strong associations with dyslipidaemia, obesity, diabetes and increased cardiovascular morbidities apart from common co-morbidities like psoriatic arthritis and depressive disorder have been reported. 19% of the psoriasis patients had concomitant diabetes while 12% of the controls also had diabetes. However, no interaction was found between occurrence of diabetes mellitus and severity of the disease. Thus, we could conclude that diabetes in these patients is an incident finding and is not related to the severity of the disease.

15% of the patients had coexistent hypertension and psoriasis as compared to 14% of controls. 20% of the patients had an increase in serum uric acid levels as compared to 17% of controls. This association was found to be of suggestive significance. However, no correlation was noted between the serum uric acid levels and the severity of the disease. Further, serum uric acid levels were not found to be significantly elevated in patients with psoriatic arthritis. Thus, we concluded that occasional elevation in serum uric acid in psoriasis patients is also an independent finding and is not related to the disease process or to the severity of the disease.

Amongst the various lipid parameters, significant rise was noted in serum triglycerides only while other parameters like HDL, VLDL, HDL and total cholesterol had no statistically significant association. Further, there was no comparability between the severity of the disease and lipid profile abnormality. In addition, we did not note any significant correlation between the derangements of lipid parameters and occurrence of co-existent diabetes or hypertension. There was also no influence of age of onset of the disease with the abnormality in lipid parameters. Thus, we concluded from our study that psoriasis patients were not at any increased risk of cardiovascular abnormalities.

Our study denies association of psoriasis with metabolic syndrome done on Indian patients. But many studies from the Western countries show such affiliation which can be interpreted on the basis of difference in the lifestyle between westerners and Indians. In addition, there is higher prevalence of coexistent risk factors like smoking and alcohol intake in the west which may contribute to morbidity and prevalence of metabolic syndrome. Furthermore, ours is the first study being conducted on newly diagnosed patients of psoriasis before initiating any therapy.

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