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Original Research Article

Analytico-empirical silhouette of concurrent disorders allied to psoriasis with liaison to biochemical parameters in patients attending a tertiary care hospital

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ABSTRACT

Background: Psoriasis is a ubiquitous ailment seen in day to day Dermatology practice. Multitude of stipulations have lead to discern pathogenesis of the disease reverberating it as a systemic disease with cutaneous manifestations being fraction of spectrum.
Aims: The aim of the study was to analyse comorbidities associated with psoriasis, with it's consortium to severity of psoriasis.
Settings and Design: Cross-sectional, descriptive study undertaken in a tertiary care centre after taking informed consent from the patients.
Materials and Methods: The study was attained over a period of 18 months. Patients with diagnosed psoriasis were evaluated for relevant demographic and biochemical parameters according to pre-set proforma. Sample size was calculated according to Cochrane formula.
Statistical analysis used: Single sample. Paired sample t test and Chi square test were used to test statistical significance and $p< 0.05$ was considered statistically significant.
Results: 66 patients attending outdoor patients ward of Burdwan Medical College and Hospital were evaluated. Prevalence of comorbidities were assessed. Mild but significant correlation was found between elevated serum triglyceride and lipid levels with severity of psoriasis. No association was found between increased serum uric acid level and psoriatic arthritis, no association was found between severity of psoriasis and blood glucose levels.
Conclusions: Since its already opined that the systemic inflammatory nature of the disease can lead to increased incidence of metabolic syndrome and lipid profile abnormalities as substantiated by western studies, it becomes irrefutable for the treating Dermatologists to be more aggressive to delve deeper and approach holistically towards treatment of the disease .
Key Messages: Psoriasis is a systemic condition rather being a mere cutaneous disorder, comprehensive knowledge of the disease aids in curbing significant morbidity.

1. Introduction

Psoriasis gleaned from Greek word "psora" means itch and "iasis" action[1] is a quintessential chance-medley archetypal of papulosqamous category characterized by scaly, erythematous plaques present in extensor surfaces. Desquamation from surface of lesions may account for lipid disorders.[2] Several studies propounded increased risk of non-cutaneous disorders inculcating occlusive diseases. Change in plasma lipid composition

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may account for increased risk of atherosclerosis.[3] Further theories propounded association of psoriasis with metabolic syndrome, with meagre data on Indian scenario.[4] This study is intended to understand more about Clinicoepidemiological profile of disease with related comorbidities in association to biochemical parameters.

2. Aims

Pathogenesis of psoriasis is quite complicated and speculation of etiopathogenesis and Genetics of the disease have impeccably surmised psoriasis to be a systemic inflammatory condition rather than a mere cutaneous entity. Comorbidities like, obesity, diabetes, Psoriaticarthritis, chronicobstructive pulmonary disease and cardiovascular ailments have been upsurged allied to psoriasis unscrupulously in global scenario. These comorbidities are often allied to the inflammatory background of psoriasis and often have multifactorial aetiology. Psoriatic patients may predispose to develop other diseases with inflammatory component due to the systemic inflammatory response of psoriasis. Various other factors conglomerates with it further like disease duration, family history, as well as lifestyle patterns which all have role to play. Though speaking globally, it remains controversial to ascertain all such assumptions in Indian scenario. Thus, clear insight about association of clinical types and severity of psoriasis will help us to bridge the knowledge gap and predicting risk of allied cardiovascular diseases. This study is purported to add some valuable insights about such.

3. Objectives

1. Todetermine the prevalence of psoriatic arthritis with relation to serum uric acid level in psoriatic patients.
2. To assess the prevalence of Diabetes and impaired glucose tolerance in psoriatic patients.
3. To determine abnormalities in lipid profile in psoriatic patients.
4. To determine prevalence of COPD in psoriatic patients
5. To assess the association of these comorbidities with severity of psoriasis.

4. Materials and Methods

Study was conducted between May 2021 to October 2022, after getting approval from institutional ethics committee. Ethics Approval Number: BMC/I.E.C/009. (Dated: 8/01/2021). For assessment of severity of psoriasis and metabolic disorders PASI score and NCEP-ATP III Criteria was used.[5]

Prevalence of psoriasis in India tend to be 0.4-2.88%.[6] Taking confidence level 95%, margin of error 5%, minimum sample size for our study was calculated to be 66.

It was cross-sectional descriptive study designed over 18 months. Patients were screened for eligibility in the study taking into account of inclusion and exclusion criteria.

Eligible patients were counselled in their own vernacular and informed consent was obtained from each, recruitment was done until desired sample size was reached. Relevant details of patients including biochemical parameters consistent to the study was recorded in case record form.

Patients were evaluated on basis of epidemiological parameters, comorbidities mentioned as well as severity association between comorbidities and psoriasis.

Thenceforth, all the data were tabulated in Microsoft Excel for Windows Professional 365 and subjected to further descriptive analysis using IBM SPSS statistical software ver.28.0.0. Single sample t test, paired sample t test and Chi square test or their nonparametric counter parts were used to find statistically significant association. p value < 0.005 was considered statistically significant. Microsoft Excel for windows professional 365 and SPSS software were used for drawing bar graphs.

5. Results

Age of study population ranged from 9-77 years with mean age 43.09± 14.38. Maximum proportion (48.5%) of patients belong to age group 41-60 years. There was male preponderance (59.1%) and male to female ratio was found to be 1.27:1. 62.5% of study population belonged to urban clan as against 34.8 % rural counterparts. Sedentary workers constitute major share (47%) in comparison to heavy workers (27.27%).

Prior family history of psoriasis was found in 7.8% of study population. Mean disease duration was found to be 5.53± 6.19 years. Prevalence of different comorbidities is enlisted on Table 1. Association of Psoriatic arthritis with serum uric acid and nail involvement is shown in Table 2. Patients were analysed on basis of various morphological variant of disease as mentioned in Table 3. Plaque variant is found to be commonest. Association of various comorbidities were assessed with respect to severity of psoriasis vide PASI Score shown in Table 4.

For diagnosing parameters associated to metabolic syndrome panel National cholesterol Education Program Adult Treatment Panel III criteria.[7–15] For diagnosing Diabetes Mellitus American diabetes association classification criteria was analysed.[16]

Severity of psoriasis was graded by PASI Score into Mild (1-5), Moderate (5.1-10), and Severe (10.1 and more). Plaque type of psoriasis was associated with severe psoriasis, followed by erythrodermic variant. (p value <0.001). Plaque variant was also found to be significantly associated with elevated serum triglyceride and LDL levels.(p value 0.003, 0.040 respectively)

Table 1: Prevalence of different comorbidities with psoriasis

Parameters	Frequency	Percentage
Increased BMI (>25 kg/m^2)	42	63.6%
Psoriatic Arthritis	8	12.1%
Increased uric acid level (>7.2 mg/dl male, >6 mg/ dl in female)	19	28.7%
Increased Fasting Blood Glucose level (>200 mg/dl)	14	21.2%
Impaired Glucose tolerance (PPBS>200 mg/dl)	7	10.61%
Chronic obstructive pulmonary disease	9	13.6%
Elevated total Cholesterol (>200 mg/dl)	25	37.88%
Decreased HDL (<40 mg/dl male and <50 mg/dl female	35	53.03%
Increased LDL (>100 mg/dl)	40	60.61%
Elevated Total Triglyceride (>150 mg/dl)	48	72.73%
Elevated VLDL (>30 mg/dl)	38	57.58%
Elevated Blood Pressure (>120/80 mm of Hg)	9	13.6%

Table 2: Association of Psoriatic Arthritis with related parameters.

Comorbidity	Related Parameter	p value	Association
Psoriatic Arthritis	Nail Involvement	<0.001	Yes
Psoriatic Arthritis	Serum Uric Acid	.958 (>0.001)	No

Table 3: Clinical variants of psoriasis with percentage.

Type of psoriasis	Frequency	Percentage
Plaque psoriasis	48	72.7
Erythrodermic psoriasis	4	6.1
Pustular psoriasis	3	4.5
Guttate psoriasis	3	4.5
Palmoplantar psoriasis	2	3
Scalp psoriasis	1	1.5
Plantar psoriasis	1	1.5
Inverse +scalp psoriasis	1	1.5
Nail + plaque psoriasis	2	3
Nail+ pustular psoriasis	1	1.5

Table 4: Association of comorbidities with severity of psoriasis (PASI Score)

Parameters	p value (parameter and PASI Score)	Association
Serum Uric Acid level	0.352	No
Diabetes	0.449	No
Hypertension	0.647	No
Total Cholesterol	0.149	No
Total Serum Triglyceride	0.0156	Yes
Serum LDL	0.037	Yes
Serum HDL	0.235	No
Serum VLDL	0.217	No
Psoriatic Arthritis	0.311	No
Chronic Obstructive Pulmonary Disease	0.673	No

6. Discussion

In the study population, we found the predominant clinical type of psoriasis was the plaque variant (72.7%) followed by the erythrodermic type (6.1%). Pustular and guttate variants constitutes 4.5% of total population In our study Plaque variant of psoriasis was associated with greatest increase in serum triglyceride level p-value 0.003 ($p<0.05$) and serum LDL level p value being 0.040, making it statistically significant. Though due to higher prevalence of plaque variant it was associated with greater percentage of hypertriglyceridemia (39 out of 48 total), but erythrodermic variant was individually found to have at a preponderance of hypertriglyceridemia (3 out of 4 total). Our results are found consistent with previous studies. Similarly increased LDL cholesterol although found in higher percentage in plaque variant (30 out of 39) but higher in prevalence in erythrodermic variant (3 out of 4). However no significant correlation was found between elevated total cholesterol values and types of psoriasis (p-value .319). Similarly, no association was found between decreased HDL cholesterol and types of psoriasis (p value .168). Hyperuricemia was also not found to be significantly associated with types of psoriasis (p value. 832) although a greater prevalence of Hyperuricemia is seen in plaque variant patients in our study Psoriatic arthropathy was found in 12.12% of total study population which was consistent with study conducted by Dogra et al who found 11.23% of prevalence of Psoriatic arthritis in psoriasis patients. No significant correlation was found between psoriasis severity (PASI grading and psoriatic arthritis) p-value = .311.

Prevalence studies from India are mostly hospital based. Dogra and Yadav have inferred in their article that in India, the prevalence of psoriasis varies from 0.44-2.8%,[3] taking prevalence to 2.8% sample size of our study constitutes of 66 cases. The mean age of presentation of cases was 43.09±14.38(range 9-77 years with median age of 42.05 years) which was consistent with inference of Dogra and Yadav (2010) regarding the mean age of presentation of psoriasis patients in India. Using one sample T- test this mean was found to be statistically significant as p value was less than 0.001. Maximum number of patients (48.5%) of psoriasis belonged to age group 41-60 years. Although no significant correlation was found between severity of psoriasis and age group (p value. 502). Family history of psoriasis was found in 7.8% of total population while a study in Malaysia done by khan et al. have found 23.1% of family history in psoriasis patients. No correlation between positive family history and severity of psoriasis is accounted in our study (p value. 151). Out of 66 cases 39 were males (59.1%) and 27 were females (40.1%). Male to female ratio was 1.27:1. A higher male preponderance seen in our study corroborate with other published studies. Inderjeetkaur et al found a sex ratio of 2.3: 1, Dogra and Yadav have also found higher male population (2010). Studies done by Rasool A, Priyanka MD found increased incidence of dyslipidaemia in chronic plaque psoriasis patients.[17] In a study done by Ma AR, Liu F on erythrodermic psoriasis patients found increase incidence of dyslipidaemia alongside metabolic syndrome than control group.[18]

In our study Plaque variant of psoriasis was associated with greatest increase in serum triglyceride level p value 0.003($p<0.05$) and serum LDL level p value being 0.040, making it statistically significant. Though due to higher prevalence of plaque variant it was associated with greater percentage of hypertriglyceridemia (39 out of 48 total), but erythrodermic variant was individually found to have at a preponderance of hypertriglyceridemia (3 out of 4 total). Our results are found consistent with previous studies. Similarly increased LDL cholesterol although found in higher percentage in plaque variant (30 out of 39) but higher in prevalence in erythrodermic variant (3 out of 4). However, no significant correlation was found between elevated total cholesterol values and types of psoriasis (p value .319). Similarly, no association was found between decreased HDL cholesterol and types of psoriasis (p value .168).

Hypertension is presumed to be an independent co-morbidity of psoriasis. In our study 13.6% of total study population were found to have hypertension and no correlation was found between hypertension and severity of psoriasis (p value .647) while Naik et al found 9.95% prevalence of hypertension in psoriatic patients in a study.[19] Sommer et al. (2006) and cohen et al. (2008)[20] showed that psoriasis patients had a significantly ($p>0.005$) increased association to arterial hypertension. Among the hypertensive sub population of study males were found to be 77.8% of total hypertensive population. Although higher prevalence of hypertension was found in moderate and severe (moderate>severe) grade psoriasis in our study positive correlation was not found between these two.

Diabetes mellitus was found in 21.21% of study population while Alexander et al. revealed a prevalence of 13.1% of diabetes in psoriasis patients.[21] Impaired glucose tolerance was in 10.61% of total study population, although higher percentages of people with diabetes and hypertension are found in moderate and severe psoriasis no significant association was found with severity and prevalence of these comorbidities (p value .449- DM and PASI score). Although studies in western countries have found significant association between psoriasis severity and type 2 diabetes mellitus. (Lonnberg et al). In a study done by Pereira, the prevalence of impaired glucose tolerance and diabetes mellitus was found to be 9.1% and 32.5% respectively.[22] In our study 64.29% of diabetic population were males, this could be because of high preponderance of male psoriatic study population.

Psoriatic arthropathy was found in 12.12% of total study population which was consistent with study conducted by

Dogra et al who found 11.23% of prevalence of Psoriatic arthritis in psoriasis patients. No significant correlation was found between psoriasis severity (PASI grading and psoriatic arthritis) p value=. 311. However, a prospective cohort study done by Eder et al. have shown increased prevalence of Psoriatic arthritis associated with severe psoriasis phenotypes.[23] Mean serum uric acid level was found to be 5.66± 1.88 and no significant association was found between psoriatic arthritis and increased uric acid level (p value - .958) which is consistent Nail involvement was found significantly associated with psoriatic arthritis with (p value <0.001). This is consistent found positive association between nail involvement and psoriatic arthritis (p value 0.011). The prevalence of Psoriatic arthritis was found to be 62.5% in males as against 37.5% in females which can again be due to higher male study population. Although study done by Passia et al. have shown equal gender preponderance in psoriatic arthritis.[24]

Hyperuricemia was found in 28.7% of total population (19 out of 66). Out of which males have higher prevalence (12 out of 19, 63.1%) compared to females (7 out of 19,36.8%). No association was found between hyperuricemia and psoriasis severity (p value .352), although more prevalence of hyperuricemia was noted in moderate grade (11 out of 19), followed by severe grade psoriasis (7 out of 19). Although study done in Egypt by Faragy et al. have found positive association between serum uric acid level and psoriasis severity (p value 0.002).[25] Lambert and Wright have found a high prevalence of serum uric acid above normal, but a mean value inside the normal range. A study done on Indian patients by Prasad et al revealed 45% of patients with increased serum uric acid level. Verma et al have found 26.6% patients with increased serum uric acid level. A study done by Ramesh Chand and Brenner on 50 psoriasis patients on Indian Population have shown no correlation between hyperuricemia and psoriatic skin involvement (p value .388).[26]

COPD was found in 9.09% of total study population which was consistent with study done by Nour et al. who found 10.1% of prevalence of COPD in psoriatic patients. Although higher percentages of population with COPD were seen with moderate to severe grade psoriasis (moderate>severe) no significant correlation was found between these two parameters (p value .673). Males have higher prevalence of COPD (5 out of 6, 83.3% of total). This could be attributed to other secondary modifiable demographic and personal habits like smoking and occupational exposure.

7. Conclusion

One of the most prevalent dermatological problems encountered on a daily basis is psoriasis. Its consideration as a systemic disease has been the subject of extensive recent research, with the researchers believing that the dermatological manifestations imply only portion of the spectrum. According to a recent evaluation of the research, psoriasis is coupled with metabolic syndrome. strong correlations with obesity, diabetes, and dyslipidaemia in addition to usual comorbidities like psoriasis, higher cardiovascular morbidities. There have been reports of arthritis and mental depression.

8. Contribution of Authors

The authors confirm contributions to the paper as follows:

1. Dr. Pinki Bardhan –Study concept, design and data collection, result analysis.
2. Dr. Tanusree Sarkar - Study conception & design; Draft Manuscript preparation.
3. Dr. Ashim Kumar Mondal- Data Collection; Analysis & interpretation of Results.
4. Dr. Nirmalya Kumar Das- (Corresponding Author) - Analysis & interpretation of Results.
5. Dr. Mousumi Roy Bandopadhyay- Draft Manuscript preparation.
6. Dr. Dibyendu Basu- Draft Manuscript preparation.
7. Dr. Sujata Sinha- Interpretation of Results.

9. Conflicts of Interest

None.

10. Source of Funding

None.

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