



Original Research Article

An understanding of interlink of psoriasis with metabolic syndrome- A case control study

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ABSTRACT

Psoriasis is a chronically relapsing, inflammatory, autoimmune, genetically mediated, skin disorder. Most often association of psoriasis with metabolic syndrome has been seen. Components of metabolic syndrome like diabetes, hypertension and obesity are often linked with psoriasis therefore it is crucial to understand this interlink and prompt diagnosis and treatment therefore plays important role to reduce the morbidity and mortality. It has been seen that psoriasis is associated with metabolic syndrome and its components, such as obesity, diabetes and hypertension. These phenotypically diverse conditions are found to share similar pathologic changes owing to similar susceptibility genes and genetic loci.

Objectives : 1: Selection of clinically diagnosed cases of psoriasis vulgaris attending the Derma OPD; 2: Evaluation of the psoriasis vulgaris patients on different parameters ; 3: Comparison of the cases with age and sex matched control groups; 4: Study the link of psoriasis vulgaris with metabolic syndrome.

Study Design: It is Case Control study (100 cases and 100 controls).

Results: Our study shows that in comparison to non-psoriatic patients i.e 12 (12%) metabolic syndrome is present in 37 (37%) of the psoriatic patients attending the OPD during the period of Jan 2017 to Dec 2017 i.e 1 year duration. the result is statistically significant (odds ratio (OR) –3-175, Degree of freedom(df)-1, p value-0.002. χ^2 2 -8.772].

Conclusion: Study shows that psoriasis is highly linked with metabolic syndrome and its components.

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1. Introduction

Psoriasis is a chronic relapsing, immune- mediated (T cells) inflammatory and genetically determined cutaneous disease which occasionally involves the joints.¹ it is also subjected to various environmental risk factors. Several observational studies have recently demonstrated the association of psoriasis with systemic disorders cardiovascular disease, the metabolic syndrome (MS), cancer, chronic obstructive pulmonary disease, inflammatory bowel disease, depression and osteoporosis posing life long burden on those who are affected with this.^{2,3} Other traditional risk factors that act as independent risk factors for psoriasis are diabetes, obesity and hypertension. These are phenotypically different

conditions that share common susceptible genes and genetic loci. Pathological changes like chronic inflammation, angiogenesis and oxidative stress are common both in psoriasis and other metabolic syndrome so these similarities further suggest that there is a strong link of Psoriasis with other metabolic syndrome. As psoriasis is an immune-mediated disease, the components that plays key role in the pathogenesis of psoriasis are TNF- α and interleukin-6. These are also found to be linked with increased insulin resistance observed in patients with psoriasis.³ Therefore psoriasis should be seen as a systemic disease rather a cutaneous disease. TNF interfere with insulin signaling by inhibiting tyrosinase kinase activity of insulin receptor which results in insulin resistance in these patients. Addition to this TNF also promotes proliferation of epidermis and enhances adipogenesis and suppresses

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glucose metabolism. It also influences insulin sensitivity by suppressing adiponectin from adipocytes. As discussed above genetics play a critical role in the susceptibility of psoriasis and metabolic diseases as Psoriasis Susceptibility loci PSORS2, PSORS3 and PSORS4 are found to be associated with loci of susceptibility genes for disorders such as Diabetes Mellitus type 2, Familial Hyperlipidaemia and Cardiovascular disorders.⁴ overall about 3% of the population are affected across the world.¹ Recent studies have also suggested that about 30-50% of population affected by psoriasis are associated with metabolic syndrome. This increased frequency demands appropriate treatment and more studies to combat this problem to decrease morbidity in these patients.

2. Materials and Methods

The present study was conducted within a duration of one year from Jan 2017-December 2017 in the Department of Biochemistry, K.D Medical College and Hospital and Research Centre, Akbarpur, Uttar Pradesh, India. It was a hospital based case control study that has included a series of age and sex matched 100 cases of psoriasis and 100 controls of non-psoriatic patients (1:1 matching).

2.1. Inclusion criteria

All newly clinically diagnosed cases of psoriasis attending OPD and admitted in ward, not taking any medication that is known to affect the outcome of psoriasis or otherwise cause hyperglycemia, deranged lipid profile and hypertension. Controls were patients other than psoriasis affected with other dermatological disorders. The source population for cases and controls was the same. All records of particulars were maintained in a standard proforma after taking an informed consent from all the cases and controls. Approval from ethical committee was taken.

A detailed clinical history and examination of all the cases and controls was done. Which includes age, sex, weight, height, history of smoking and alcohol habit, age of onset and duration of psoriasis, type and severity of psoriasis. Assessment of metabolic syndrome was done for all the cases and controls by Blood Pressure measurement, Waist Circumference and Body Mass Index (BMI). BMI was calculated as weight in kilograms/height² in meters. Upper most part of hip bone around the abdomen was measured to calculate waist circumference. Severity of psoriasis was assessed with psoriasis area and severity index (PASI). Biochemical parameters like Blood Fasting glucose level, Lipid profile was done for all the cases and controls. Association of metabolic syndrome with psoriasis was established when three or more of the five criteria as suggested by National Cholesterol Education Programme's Adult Panel III was present i.e. abdominal obesity calculated by waist circumference in cm for Men

- ≥ 80 cm, Women ≥ 90 cm, Elevated triglycerides: ≥ 150 mg/dL (1.7 mmol/L), Reduced HDL ("good") cholesterol: Men < 40 mg/dL (1.03 mmol/L) Women < 50 mg/dL (1.29 mmol/L), Elevated blood pressure: $\geq 130/85$ mm Hg or use of medication for hypertension, Elevated fasting glucose: ≥ 100 mg/dL (5.6 mmol/L) or use of medication for hyperglycemia. Fasting Venous blood samples were taken after an overnight fast.

Enzymatic methods were used to measure Serum cholesterol and triglycerides in Bechman coulter (AU480). Plasma glucose was measured using glucose oxidase method. Conclusion was drawn on the grounds of all findings. SPSS and EPI info software was used for analyzing the results and necessary test of significance (chi square test) was applied.

3. Results

Results from the above findings have been shown in the given table which includes 100 cases and 100 controls which are age and sex matched.

Duration of disease in studied cases varies from three months to twenty five years and 70% of cases and controls were from rural areas.

Psoriasis area and severity index (PASI) score ranged from 0.8 to 45.7. Most chronic plaque type of psoriasis was the most common i.e. 89 (89%). Metabolic syndrome was found to be significantly associated with psoriasis in comparison to controls. Metabolic Syndrome was present in 37 (37%) of psoriatic cases in comparison to 12 (12%) of non-psoriatic cases. [Odds ratio (OR) - 3.175 which is statistically significant, Degree of freedom (df) - 1 p-value 0.002, χ^2 - 8.772] after adjusting for age. Other associated risk factors like dyslipidemia, obesity, impaired fasting glucose and hypertension were also more prevalent in cases than in controls.

The above findings of various metabolic parameters along with odds ratio and p value have been shown in the given Table 2.

Although there was no significant difference regarding disease duration, gender or prevalence of smoking and alcohol still we observed psoriasis is associated with an early onset of metabolic syndrome.

4. Discussion

The present study showed significant association of psoriasis with metabolic syndrome. Not only this the other risk factors like diabetes, hypertension, hyperlipidemia and obesity act as additional risk factors for psoriasis were also found to be increased in psoriasis. Various similar studies have been done to establish this association. For instance, Alexander et al.^{5,6} showed that psoriasis was significantly associated with diabetes mellitus in Indian population. Study by A Jucci et al showed association of

Table 1:

Particulars	Cases(n =100)	Controls(n =100)
Male/Female ratio	56/44	56/44
Age range(mean)	1-80(42.5)	1-80(42.5)
Alcoholic, n	31(31%)	29(29%)
Smoker, n	27(27%)	31(31%)
Body Mass Index (mean $\pm$ SD)	26.27 $\pm$ 6.67	24.81 $\pm$ 5.49

Table 2:

	Cases	Controls	OR	P-value
HDL cholesterol <40mg/dl(M) or <50mg/dl (F)	76	55	0.305	0.00
Fasting blood glucose >100mg/dl	35	23	2.105	0.021
Triglyceride levels>150mg/dl	57	5	4.321	0.00
Waist circumference $\geq$ 80cm (M), $\geq$ 90 cm (F)	72	21	2.978	0.001
Blood pressure $\geq$ 130/85 mm Hg	59	39	1.431	0.022
Metabolic syndrome	37	12	3.209	0.002

insulin resistance in psoriasis.⁷ TNF α plays crucial role in insulin resistance by inhibiting tyrosine kinase activity of insulin receptor. McDonald et al showed that psoriatic patients are at increased risk of developing cardiovascular risk⁸ Lipoprotein A is also found to be increased in psoriasis. It has a pivotal role in cardiovascular pathology. Angiotensin converting enzyme, Endothelin 1(ET-1) and rennin which promotes hypertension were also found to be increased in psoriatic patients.³ Modulation of adipocytes as seen in psoriatic patients due to adiponectin results in salt retention via Angiotensin II.⁹ Adipose tissue in psoriatic patients may act as a major source of angiotensinogen, which is subsequently converted into Angiotensin II.⁹ Angiotensin II promotes T cell¹⁰ proliferation and also promote inflammation and atherosclerosis development.¹¹ IL6 results in increased C-reactive protein level and ESR.¹² Both psoriasis and hypertension has increased oxidative stress and angiogenesis. Cytokines, such as tumor necrosis factor (TNF)-alpha and interleukin (IL)-6 also plays the essential role though increased cytokines levels affect metabolism at a small level but it is detrimental in long terms.¹³ As it is known that psoriasis increases the risk for myocardial infarction even if the other risk factors for the MI is controlled psoriasis acts as independent risk factor for the same so it is important for timely diagnosis and treatment of psoriasis.¹⁴

Furthermore, patients with severe psoriasis are associated with higher rates of obesity and diabetes than those with mild psoriasis.¹⁵ as psoriasis is associated with other comorbidities hence it is necessary for timely diagnosis and treatment of psoriasis patient awareness to the risk associated with psoriasis, necessity for timely followup with biochemical investigations and treatment of psoriasis is important to reduce morbidity and mortality and also to reduce health care burden. Knowledge of these risk factors

is important with respect to the patients' general health but may also influence how we manage our patients.

5. Conclusion

There is a significantly higher prevalence of metabolic syndrome and its component in psoriasis vulgaris patients as compared to general population. So it is necessary to not only determine its role in psoriasis but also to emphasise the importance of routine investigations to reduce the risk of developing these serious comorbidities.

6. Source of funding

None.

7. Conflict of interest

None.

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