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Research Article

A Study of serum hsCRP levels to assess severity in patients with Psoriasis

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Abstract

Introduction: Psoriasis is a common chronic skin disease, characterized by sharply demarcated, erythematous, scaly plaques. Psoriasis is supposed to be initiated by interplay between genetic, environmental, and immunological factors. C-reactive protein (CRP) has special importance for psoriasis due to its relation with cytokines which are responsible for skin inflammation. The present study determine the level of CRP by using highly sensitive method (hs-CRP) with a detection limit 0.25mg/L and its correlation with severity of disease.

Material and Methods: 50 Patients diagnosed as having psoriasis and 50 age and sex matched normal healthy control were studied after taking their consent. Psoriasis patients with Psoriasis Area Severity Index (PASI) less than 10 considered as mild Psoriasis and PASI greater than 10 considered as moderate to severe Psoriasis. Blood sample was collected under aseptic precautions in plain vacutainer for hsCRP estimation. hsCRP estimation done by latex turbidimetric method.

Results: The present study found significant correlation between hsCRP and PASI ($p < 0.0001$). Mean value of hsCRP in PASI<10 (mild psoriasis) is 1.34 mg/L± 1.06 while Mean value of hsCRP with PASI >10 (moderate to severe psoriasis) is 6.26 ± 3.84 mg/L.

Conclusion: The finding of present study suggest that Psoriasis patients with moderate to severe psoriasis (PASI > 10) have higher mean Serum hsCRP level than patient mild psoriasis (PASI <10) and controls. Serum hsCRP level correlate significantly with Psoriasis Area Severity Index (PASI) and hsCRP level can be used as marker for assessing severity of disease.

Keywords: Psoriasis, hsCRP, Psoriasis Area Severity Index (PASI)

1. Introduction

Psoriasis is a common chronic inflammatory skin disorder that shows exacerbations and remission attacks. Although psoriasis can occur at any age, the mean age of onset for the first occurrence is between 15 – 20 years, with a second peak at 55 – 60 years. Immunological factors, environmental factors and multiple genetic components may be responsible for the pathogenesis of the disease[1].

1.1 Clinical features[2]

Psoriasis is characterized by sharply demarcated, erythematous, scaly plaques of different sizes. Plaques are usually distributed symmetrically, and occur most commonly on the extensor aspects of elbows and knees, scalp, lumbosacral region, and umbilicus. Psoriasis vulgaris is the commonest type of psoriasis, accounting for 90% of all cases. Other types

include flexural (inverse) psoriasis, guttate psoriasis, generalized pustular psoriasis , and palmoplantar pustulosis..

1.2 High Sensitivity C-Reactive Protein

C-reactive protein plays a key role in the host's defence against infection. It was so named because it reacts with the C-polysaccharide of *Streptococcus pneumoniae*. In the presence of calcium, C-reactive protein specifically binds to polysaccharides such as phosphocholine moieties present on the cell surface of many pathogenic microbes. C-reactive protein binding activates the classical complement pathway and opsonises (prepares) ligands for phagocytosis. It also neutralises the pro-inflammatory platelet-activating factor and down-regulates polymorphs.

C-reactive protein is predominantly made in the liver and is secreted in increased amounts within six hours of an acute inflammatory stimulus. The plasma concentration can double at least every eight hours, reaching a peak after about 50 hours. After effective treatment or removal of the inflammatory stimulus, concentrations can fall almost as rapidly as the 5–7 hours plasma half-life of labelled exogenous C-reactive protein. C-reactive protein responses may be reduced by severe hepatocellular impairment, but renal dysfunction can elevate concentrations of C-reactive protein[3].

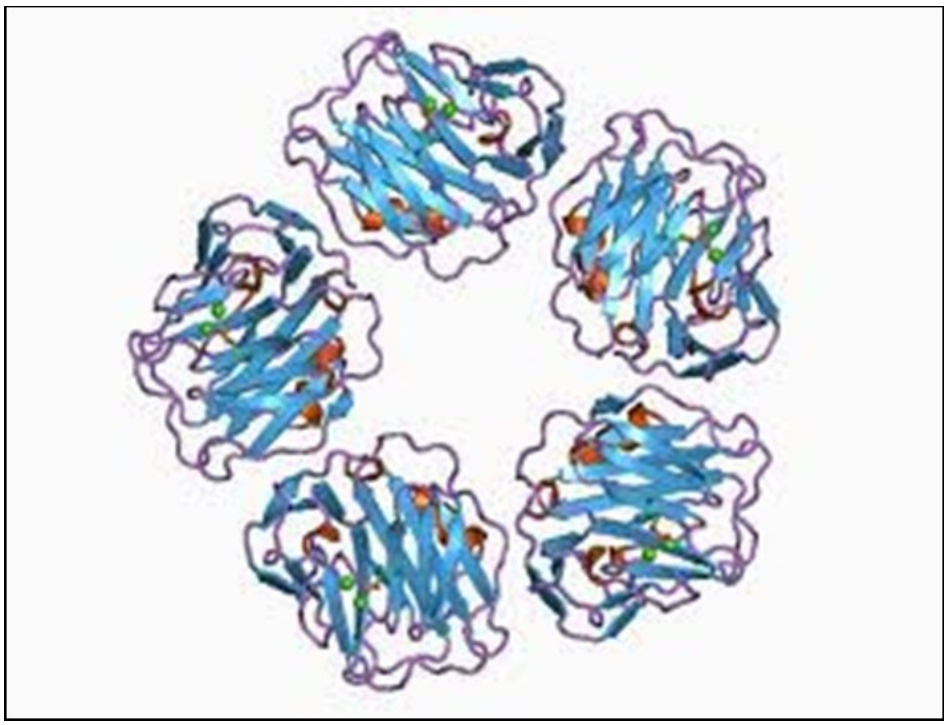

Figure 1. Structure of C-reactive protein showing five identical

1.3 polypeptide subunits[4]

C- reactive protein is a marker for acute inflammation, infection and tissue injury. highly-sensitive' C-reactive protein refers to the measurement of small changes in C-reactive protein concentrations occurring below the 'normal' cut-off used to define significant infection and inflammation[4] .

C-reactive protein (CRP) has special importance for psoriasis due to its relation with cytokines which are responsible for skin inflammation

Therefore, in the present study determine the level of CRP by using highly sensitive method with a detection limit 0.25mg/L (hs-CRP), and its correlation with severity of disease.

In 2011, A Kanelleas, C.Liapi, A Katoulis, et al conducted a study on total 41 patients with psoriasis vulgaris to assess the role of inflammatory markers in assessing disease severity and response to treatment in patients with psoriasis. They found PASI correlated with hs CRP .They postulated that hs-CRP can be used as inflammatory markers in assessing disease severity and response to treatment in patient with psoriasis[5].

A Study on 52 patients with psoriasis (38 men and 14 female with mean ± SD age 44 ± 8 years) with 50 age and sex matched controls conducted by Yiu, K.H, Yeung, C.K,Chan et al in China, in 2011 have shown that patients with psoriasis had significantly higher hs-CRP (mean ± SD 5.3 ± 5.11 mg/L in test Vs 1.9 ± 1.6 mg/L in controls). In this study they found significant correlation of hs-CRP with Psoriasis Area and Severity Index ($r=0.48, p<0.01$)[6].

A Study on 51 patients with mild to moderate psoriasis with 32 age and sex matched controls conducted by Didem Didar Balcı et al to examine hs-CRP level in patients with mild to moderate psoriasis vulgaris found that serum hs-CRP level did not show any significant difference between patients with mild to moderate psoriasis and controls ($p>0.05$) [7].

A Study By Lucy Piper on 73 patients with psoriasis vulgaris and 38 controls found mean value of CRP 4.18 mg/l in psoriasis patients versus 1.15 mg/l in controls and correlate positively and significantly with PASI and concluded that CRP together with PASI could be used as a "global index of severity " [8] .

Aims of present study is to assess serum hs-CRP level and to assess hsCRP level as marker of severity in Psoriasis patients.

2. Material and methods

2.1 Source of data

The present study was conducted to estimate serum levels of hsCRP in patients of Psoriasis at clinical chemistry laboratory of Biochemistry department of S.S.G.Hospital and Medical College, Baroda.

50 patients of 20-50 years of age group diagnosed as having psoriasis from skin &V.D. department forms the test group. 50 age and sex matched healthy volunteers forms the control group. Psoriasis patients with Psoriasis Area Severity Index (PASI) less than 10 considered as mild Psoriasis and PASI greater than 10 considered as moderate to severe Psoriasis [9].

Subjects with known chronic diseases. i.e. Tuberculosis, Any apparent signs of acute or chronic inflammation (hepatitis, arthritis or auto immune disease), Liver or renal problems,Excessive alcohol consumption, Pregnant women were excluded from study.

- Study group were selected from outpatient section of Skin and V.D. department of S.S.G. Hospital and Medical College, Baroda. Patients were diagnosed by clinical features of psoriasis.
- After obtaining consent from the subject 5ml of blood sample was collected under aseptic precautions in in plain vacutainer.
- A Detailed history which including personal data, present complaints, past history, family history, personal history and treatment history was taken followed by physical examination.
- Estimation of hsCRP was done by Latex Turbidimetry_method using kit from Erbachem on fully automated biochemistry analyzer Miura-300 [10] .
- Calibration graph was prepared as per instruction given in kit literature using working CRP Calibrator concentrations 25 mg/L,12.5 mg/l, 10 mg/L, 5 mg/L , 2.5 mg/L and 1 mg/L and results were calculated accordingly.
- hsCRP concentration in the sample is calculated by interpolation of its (A_2-A_1) in this calibration curve .
- Results were compared with controls everytime samples were run.

Reference range : up to 3 mg/L

Serum Urea, Serum Creatinine and Serum SGPT to rule out involvement of liver and kidney diseases. Estimation of Serum Urea was done by GLDH method,Serum Creatinine by modified jaffe's method and SGPT by IFCC UV Kinetic method on fully automated biochemistry analyzer.

2.2 Assessment of Severity Based on PASI[11,12]

Psoriasis Area and Severity Index (**PASI**) is the most widely used tool for the measurement of severity of

psoriasis. PASI combines the assessment of the severity of lesions and the area affected into a single score in the range 0 (no disease) to 72 (maximal disease). PASI less than 10 considered as mild Psoriasis and PASI greater than 10 considered as moderate to severe Psoriasis.

2.3 Calculation

The body is divided into four sections (head (H) (10% of a person's skin); arms (A) (20%); trunk (T) (30%); legs (L) (40%)). Each of these areas is scored by itself, and then the four scores are combined into the final PASI. For each section, the percent of area of skin involved, is estimated and then transformed into a grade from 0 to 6:

0% of involved area, grade: 0

< 10% of involved area, grade: 1

10-29% of involved area, grade: 2

30-49% of involved area, grade: 3

50-69% of involved area, grade: 4

70-89% of involved area, grade: 5

90-100% of involved area, grade: 6

Within each area, the severity is estimated by three clinical signs: erythema (redness), induration (thickness) and desquamation (scaling). Severity parameters are measured on a scale of 0 to 4, from none to maximum.

The sum of all three severity parameters is then calculated for each section of skin, multiplied by the area score for that area and multiplied by weight of respective section (0.1 for head, 0.2 for arms, 0.3 for body and 0.4 for legs).

3. Result and Analysis

As defined in materials and methods, the study group consisted of 100 individuals; 50 were diagnosed with psoriasis disease and 50 were healthy controls.

Statistical analysis was done by using t-test to find out significance of difference between two groups and correlation coefficient to find out statistical correlation between two variables and its significance. Interpretation was done according to p-values as follows:

$p < 0.05$ was considered significant

$p \geq 0.05$ was considered not significant

Estimation of serum hsCRP, was carried out in patients as well as in controls.

Table 1: Comparison of study groups:

Number of Patients	**PASI<10**		**PASI>10**		**Controls**	
	30		**20**		**50**	
Sex (M/F)	21/9		10/10		24/26	
	Mean	SD	Mean	SD	Mean	SD
Average Age (in years)	40.3	12.5	40.6	11.8	39	6
Serum hsCRP (mg/L)	1.34	1.06	6.26	3.84	1.43	0.52
Serum Urea (mg/dl)	24.2	9.9	24.7	8.3	25.1	10.8
Serum Creatinine (mg/dl)	0.86	0.17	0.81	0.15	0.84	0.18
Serum SGPT (U/L)	23.3	12.6	23.5	9.8	24.2	14.1
PASI	3.0	1.7	16.9	4.1	-	-

Table 2: Serum hsCRP level in study group

Group	Number of patients	Mean (mg/L)	SD(mg/L)	SE of mean
PASI <10	30	1.34	1.06	0.19
PASI >10	20	6.26	3.84	0.859
Controls	50	1.43	0.52	0.073

Figure 2 : Comparison of hsCRP level in study group

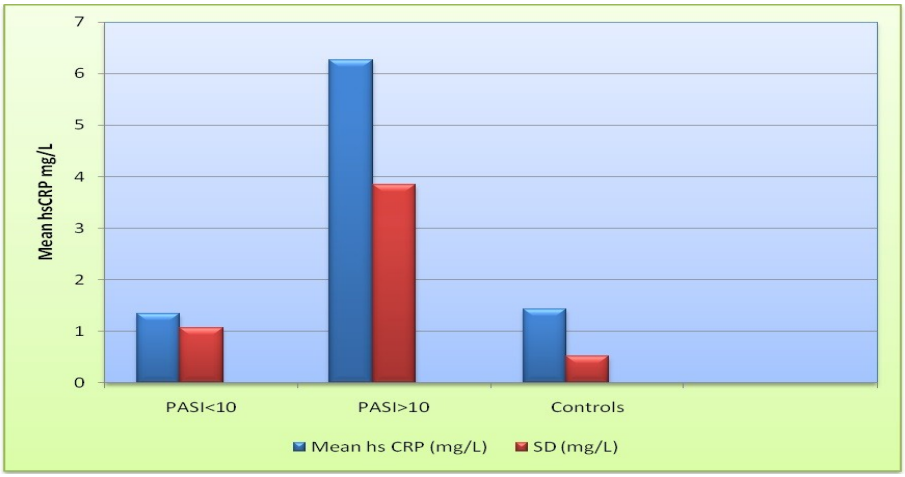

Table 3: Correlation between PASI and serum hsCRP in Psoriasis patients

		Serum hsCRP
PASI	Sample size	50
	Correlation coefficient r	0.8551
	Significance (p value)	P<0.0001

There is a positive and significant correlation between PASI and hsCRP level with r= 0.8551 and p value <0.0001.

Figure 3 :Correlation of hsCRP with PASI in psoriasis patients (n=50)

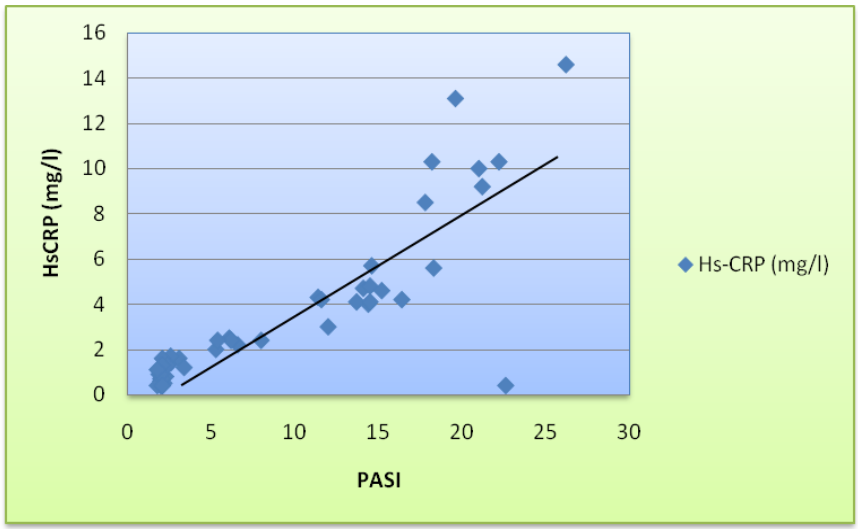

Table 4 : p value of serum hsCRP in study group

P value	PASI <10 and PASI >10	PASI>10 and Controls	PASI <10 and Controls
Serum hsCRP	<0.0001	< 0.0001	≥ 0.05

4. Discussion

Psoriasis has been accepted as a multi-factorial disease with genetic susceptibility. The lesions in psoriasis develop secondary to T-cell mediated hyper proliferation of keratinocytes which is induced by antigen-presenting cells on the skin[2]. It is widely accepted that genetic predisposition and environmental factors have a profound effect on the immune system and play a crucial role in triggering psoriatic lesion development. In this research, psoriatic patients were categorized into two main types according to severity, mild and severe psoriasis groups.

In my study 50 patients of 20-50 years of age group diagnosed as having psoriasis from skin &V.D. department forms the test group. 30 patients had PASI less than 10 (mild psoriasis) while 20 patients had severe psoriasis (moderate to severe psoriasis).

Age and sex distribution in the test group

Age in years	No of cases			% of total cases
	Male	Female	Total	
20-30	05	05	10	20%
31-40	12	06	18	36 %
41-50	14	08	22	44 %
Total	31(62 %)	19 (38 %)	50 (100 %)	100 %

So in my study Higher incidence of psoriasis in age group of 41-50 years as compare to other group while men (62 %) were affected more than female (38%).

C-reactive protein seem to provide a marker for worsening of psoriasis. An acute phase of psoriasis can be induced by cytokines involved in psoriatic pathogenic phenomena. Activation of the acute phase reaction by proinflammatory cytokines may account for systemic symptoms in severe psoriasis. C-reactive protein (CRP) a marker of inflammation, in patients with moderate to severe plaque psoriasis .

The present study found significant correlation between hsCRP and PASI ($p < 0.0001$). Mean value of hsCRP in PASI<10 (mild psoriasis) is 1.34 mg/L while Mean value of hsCRP with PASI >10 is 6.26 mg/L

Comparison of serum hsCRP of present study with previous studies

Parameter	Previous study by Yiu KH et al6 (Study of 52 patients and 50 controls)	Previous study by Lucy piper 8 (A study of 73 patients and 38 controls)	Present study with moderate to severe psoriasis (A study of 50 patients and 50 controls)
Mean serum hsCRP level (mg/L) with p value compared to controls	5.3 mg/L (p<0.01)	4.18 mg/L (p<0.01)	6.26 mg/L (p< 0.0001)
Correlation of hsCRP with PASI (p value)	p < 0.01	p < 0.01	p < 0.0001

The present study correlate significantly with previous studies suggesting hsCRP level correlate significantly with PASI (Psoriasis Area Severity Index)

The small number of the patients in study and control groups is the main limitation of the present study. Additional studies with a large number of patients are needed to validate the exact pathophysiologic relationship between the psoriasis and hsCRP level. Finally this result it refers to the that patients with severe psoriasis had been increased inflammation, as

exhibited by elevated hsCRP levels so this reinforces that psoriasis is not only a skin disease, but in some patients could be a serious medical condition

5. Conclusion

The finding of present study suggest that Psoriasis patients with moderate to severe psoriasis (PASI > 10) have higher mean Serum hsCRP level than patient mild psoriasis (PASI <10) and controls. Serum hsCRP level correlate significantly with Psoriasis Area Severity Index (PASI) and hsCRP level can be used as marker for assessing severity of disease.

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