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Serum C-reactive Protein in Psoriasis Vulgaris: A Case-control Study in a Tertiary Care Hospital from Southern India

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

Aims: The present study was designed to assess the levels of serum C - reactive protein in different severity group of psoriasis vulgaris.
Study Design: Case-control study.
Place and Duration of Study: Clinically diagnosed and untreated psoriasis vulgaris patients are recruited from out patients department of Dermatology, J.J.M. Medical College, Davangere, Karnataka (India) from May 2015 to April 2016.
Methodology: A case control study was conducted on sixty clinically diagnosed and untreated cases of psoriasis vulgaris. Sixty age and sex matched healthy controls were also recruited from general population of Davangere, Karnataka. The psoriasis patients were divided into three groups mild, moderate, severe based on Psoriasis Area Severity Index. Venus blood sample was collected from each study subjects and analyzed for C - reactive protein by immunoturbimetric method.
Results: Mean serum C-reactive protein were found to be significantly (<0.001) higher in various severity groups of psoriasis (5.96 ± 3.96 mg/dl) as compare to healthy controls (0.28 ± 0.12 mg/dl).
Conclusion: Serum C-reactive protein may be useful immune marker to evaluate the severity of psoriasis and could be used to monitor psoriasis and its treatment.

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Keywords: C - reactive protein; inflammation; psoriasis; PASI scores.

1. INTRODUCTION

Psoriasis is a common chronic, recurrent inflammatory and proliferative disease of skin. It affects about 1%-2% of the Indian population [1]. 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 [2].

Psoriasis is typically manifested by focal formation of inflamed, thickened areas of altered skin, presenting as raised reddened plaques covered by silvery white scales that may itch and bleed. Histological studies of psoriatic lesions have shown leucocytes infiltration, namely by T lymphocytes and neutrophils [3]. C-reactive protein is non-specific but most sensitive indicator of inflammation and its production is part of the nonspecific acute-phase response to most forms of inflammation, infection, and tissue damage [4,5].

It is proposed that psoriasis development depends on skin infiltration of Th1/Th17 cells that stimulate macrophages and dermal dendritic cells to release mediators that sustain inflammation and cause abnormal keratinocytes proliferation. The mediators of the Th17 immune system include IL-1, IL-6, IL-23 and transforming growth factor (TGF)-β [6].

Elevated C-reactive protein levels result from the interaction between pro-inflammatory cytokines, namely IL-6, TNF-alpha and IL-1 [7]. The increased magnitude of CRP seems to be related to the extent of tissue injury and inflammation severity in active stage of psoriasis [8].

The aim was to study CRP, a very sensitive marker of inflammation in psoriasis vulgaris patients, to evaluate their potential value as monitors of the disease.

2. MATERIALS AND METHODS

A case control study was conducted to estimate the levels of serum C-reactive protein in psoriasis patients. In this study, sixty clinically diagnosed and untreated psoriasis vulgaris patients are recruited from out patients department of Dermatology, J.J.M. Medical College, Davangere, Karnataka (India) from May 2015 to April 2016. Diagnosis of psoriasis was based on clinical history and histo-pathological examination of skin lesions. Sixty healthy controls provide serum sample for C-reactive protein measurement. These controls are age matched with the study group and selected from healthy population of Davangere.

Psoriasis patients are divided into mild, moderate and severe group of psoriasis based on Psoriasis Area Severity Index (PASI) score [9]. The psoriasis patients PASI score with 1.0 to 7.9 grouped into mild psoriasis, with 8.0 to 14.9 into moderate psoriasis and 15.0 or more than 15.0 included into severe psoriasis. Each group consisted of 20 patients as shown in Table 1.

All subjects included in this study gave a written consent and this study was approved by the ethical and research committee of J.J.M Medical College, Davangere (Karnataka) to use human subjects as research purpose. The subjects with a history of any other inflammatory skin disorders, autoimmune disorders like systemic lupus erythematous, rheumatic arthritis, any carcinoma, severe cardiovascular disorders, chronic kidney disease, chronic smoking and alcoholics, fungal infection, pregnant and lactating mother were excluded from study. Patients taking systemic or topical medication were also excluded from this study.

Table 1. Demographic data of studied subject. Psoriasis cases further divide into three groups based on (Psoriasis area severity index) PASI score

Variables	Controls	Psoriasis patients		
		Mild	Moderate	Severe
Male (No.)	36	12	12	12
Female (No.)	24	8	8	8
Age in years				
(Mean ± SD)	41.9 ± 9.1	42.6± 8.7	42.7 ±8.76	39.7 ±10.6
PASI score (Mean ± SD)	-	5.8 ± 1.4	10.8 ±1.89	16.9 ± 1.4

Under aseptic precaution 5 ml of fasting venous blood sample was collected in plane bulb. Serum sample were separated immediately after centrifugation at 4℃, 2000 g for 10 minute. Serum C-reactive protein is estimated by immunoturbidimetric method [10] based on the principle of agglutination reaction. The statistical analysis was performed using SPSS. Student's t test is used to evaluate the difference between the cases and controls. Multiple group comparison was done by using one way ANOVA followed by Tukey's Post Hoc test. Results were expressed as mean ± SD. A p-value of 0.05 or less was considered as bio statistically significant.

3. RESULTS

We analyzed the results to study the differences between controls and patients, among different group of psoriasis vulgaris, and to find values of prognostic significance for worsening of the disease.

We found a significant (p=0.001) higher value of serum CRP in subjects with psoriasis (5.96 ± 3.96 mg/dl) as compared to normal healthy controls (0.28 ± 0.12 mg/dl) as shown in Table 2. A significant increased level of serum CRP was also found in severe groups of psoriasis as compare to mild and moderate group of psoriasis. Moreover the control group presented lower values of CRP as compared with mild psoriasis.

Statistical analysis evaluate the mean levels of serum CRP are successively increased in subjects with mild group of psoriasis (1.62 ± 0.39 mg/dl) to moderate psoriasis (5.61 ± 0.85 mg/dl) and moderate group of psoriasis to severe group of psoriasis (10.64 ± 2.23 mg/dl) significantly (p=0.001 (Fig. 1).

The statistical analysis by one way ANOVA followed by Tukey's Post hoc test shows the comparison of levels of serum CRP in different severity groups of psoriasis (Table 3).

4. DISCUSSION

There are several cross-sectional studies addressing role of C-reactive protein in inflammation of psoriasis and most of them are in agreement with our results. Most of these studies, however, used patients presenting different forms of psoriasis and reflecting the elevated levels of C-reactive protein in psoriasis.

In the current study significant higher levels of serum C-reactive protein observed in psoriasis subject as compare to healthy controls. This indicates about the expression of cytokines and immunological dysfunctions at affected keratinocytes. These findings are in accordance with studies of Rocha –Pereira P et al. [2].

Coimbra S et al. [4] reported a positive correlation between C-reactive protein and severity of disease in psoriasis. They proposed C-reactive protein, one of the most sensitive markers of inflammation, as the most promising biomarker to evaluate psoriasis severity and to monitor the response to different types of treatment of psoriasis. Findings of this study support the result of our research work.

In present study there are significant increased levels of serum C-reactive protein in various group of psoriasis as compare to healthy controls. Our results support the hypothesis that the psoriasis is classical tissue damage and inflammatory skin disorder. Our results are in accordance with the work of Laurent M R, Panayi G S, and Shepherd P [11] and Jain Isha V K and Lal H [12].

The finding of the study conducted by Agravatt AM and Sirajwala HB [13] suggest that psoriasis patients with moderate to severe psoriasis have higher mean serum hs-CRP level than patient mild psoriasis and controls. Serum hsCRP level correlate significantly with Psoriasis Area Severity Index and hs-CRP level can be used as marker for assessing severity of disease.

Table 2. Serum C-reactive protein (CRP) levels in controls and different severity groups of psoriasis

Variable	Controls mean ± SD	Cases (Mean ± SD)			Controls / Cases		
		Mild	Moderate	Severe	Mean diff.	t value	*p* value
CRP (mg/dl)	0.28 ± 0.12	1.62±0.39	5.61± 0.85	10.64± 2.23	5.68	11.09	<0.001

CRP= C-reactive protein

Table 3. Comparison of serum CRP levels in relation to severity of psoriasis

Groups			CRP (mg/dl)
1. Mild			1.62 ± 0.39
2. Moderate			5.61 ± 0.85
3. Severe			10.64 ± 2.23
ANOVA	F value		208.65
	p value		0.001
Difference between groups (p values)	1 v/s 2	Mean Diff	3.99
		p value	0.001
	1 v/s 3	Mean Diff	9.01
		p value	0.001
	2 v/s 3	Mean Diff	5.03
		p value	0.001

CRP=C-reactive protein; One way ANOVA followed by Tukey's Post hoc test; p value =0.001 is highly significant

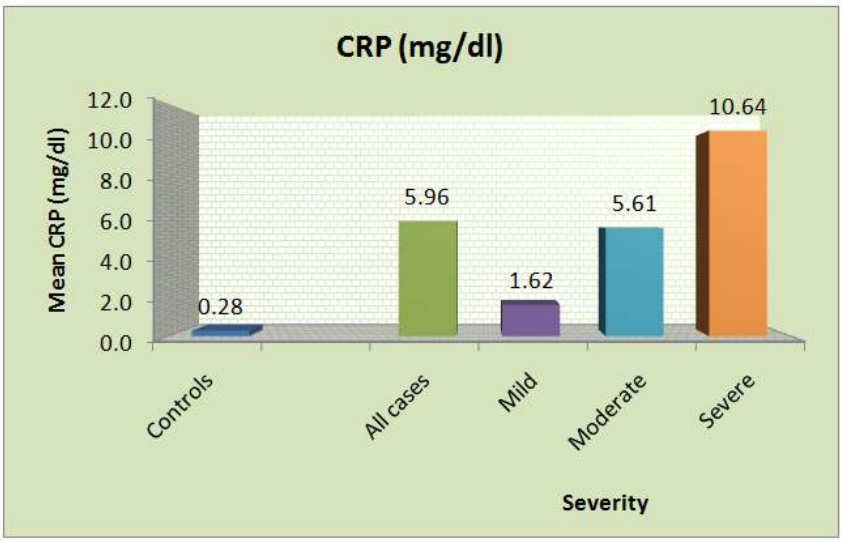

Fig. 1. Serum CRP levels in controls and different severity groups of psoriasis

Ozelm K et al. [14] and Beygi S, Lajevard V and Abedini [15] demonstrate the positive correlation found between PASI scores and inflammation and haemostatic markers in the psoriasis group. The findings of our study is in corroborate with their findings.

A study conducted by Sergeant Al [16] and B. Mahmoud Farshchian [17] showed that patients with moderate to severe plaque-type psoriasis had active systemic inflammation, which was demonstrated by increased levels of C-reactive protein and skin disease severity was correlated with serum C-reactive protein levels.

Asha Ramay Vadakayil, Sukumar Dandekeri and Neema M. Ali [18] found that elevated levels of serum CRP may be an independent risk factor for CVD in patients with psoriasis. The C-reactive protein may be considered as a useful marker of psoriasis severity that could be used to monitor psoriasis and its treatment.

5. CONCLUSION

In present study, we tried to characterize the inflammatory response in various severity groups of psoriasis, by establishing the differences among these groups of psoriasis vulgaris. CRP may be a potential tool to monitor the disease.

At last our research work will be helpful in making novel strategies for diagnosis, treatment and prognosis of psoriasis vulgaris.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Dogra S, Yadav S. Psoriasis in India: Prevalence and pattern. Indian Journal of Dermatology, Venereology, and Leprology. 2010;76(6):595-601.
2. Rocha-Pereira P, Silva AS, Rebelo I, Figueiredo A. Clinical and laboratory investigations: The inflammatory response in mild and severe psoriasis. British Journal of Dermatology 2004;150:917-928.
3. Murphy M, Kerr P, Grant-Kels JM. The histopathologic spectrum of psoriasis. Clin Dermatol. 2007;25:524–528.
4. Susana C, Alice SS. Biomarkers of psoriasis severity and therapy monitoring. World Journal of Dermatology. 2014;3(2): 15-27.
5. Johnson AM. Amino acid and proteins. In: C A Burtis, E R Eshwood, D E Bruns Teitz fundamental of clinical chemistry. New Delhi: Elsevier. 2008;301-303.
6. Yasar I, Mualla P, Erdink S, Ali H. Cellular immune response in patients with chronic plaque psoriasis: Evaluation of serum neopterin, procalcitonin, anti-streptolysin O and C-reactive protein levels. Journal of Clinical and Experimental Dermatology Research. 2010;1(2):1-4.
7. Thompson D, Pepys MB, Wood SP. The physiological structure of human C-reactive protein and its complex with phosphocholine. Structure. 1999;7(2):169-77.
8. Ragab HM, Maksoud N, Farid M. Biochemical significance of pro-inflammatory cytokines in psoriasis vulgaris among Egyptian patients. Journal of American Science. 2010;6(10):423-429.
9. Langley RG, Ellis CN. Evaluating psoriasis with psoriasis area and severity index, psoriasis global assessment, and lattice system physician's global assessment. J Am Acad Dermatol. 2004;51:563-9.
10. Vaishnavi C. C-reactive protein in bacterial infection. Immunol Infect Dis. Journal. 1996;6:139-144.
11. Laurent MR, Panayi GS, Shepherd P. Circulating immune complexes, serum immunoglobulin, and acute phase proteins in psoriasis and psoriatic arthritis. Annals of the Rheumatic Diseases. 1981;40:66-69.
12. Jain Isha VK, Lal H. C-reactive protein and uric acid level in patient with psoriasis. Indian Journal of Clinical Biochemistry. 2011;26(3):309-311.
13. Agravatt AM, Sirajwala HB. A study of serum CRP levels to assess severity in patients with psoriasis. International Journal of Biomedical and Advance Research. 2013;4(07):460-466.
14. Ozlem K, Rifat EU, Alev AE, Emrullah S, Bilal D. Inflammation and hypercoagulable state in adult psoriatic men. Acta Dermato Venereology. 2008;88:337–340.
15. Beygi S, Lajevard V, Abedini R. C-reactive protein in psoriasis: A review of the literature. Journal of the European Academy of Dermatology and Venereology. 2014;28(6):700–711.
16. Sergeant A, Makrygeorgou A, Chan WC. C-reactive protein in psoriasis. Br J Dermatol. 2008;158:417–419.
17. C-reactive protein serum level in patients with psoriasis before and after treatment with narrow-band ultraviolet B. Mahmoud Farshchian, Akram Ansar, Mohammadreza Sobhan, Valiollah Hoseinpoor. An Bras Dermatol. 2016;91(5):580-3.
18. Role of C-reactive protein as a marker of disease severity and cardiovascular risk in patients with psoriasis. Asha Ramay Vadakayil, Sukumar Dandekeri and Neema M. Ali Indian Dermatol Online Journal. 2015;6(5):322–325.

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