C-Reactive Protein and Uric Acid Levels in Patients with Psoriasis

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Abstract Serum CRP and uric acid levels were estimated in twenty-five patients with psoriasis (group III) before and after 12 weeks of treatment. Results were compared with a group of 25 normal subjects (group I) and a group of 25 patients of various skin diseases other than psoriatic lesion (group II). Mean value for CRP was found to be increased by more than 20 folds in patients with psoriasis, which was subsequently reduced to nearly 50% of the initial value after 12 weeks of treatment. These patients also showed hyperuricemia. Nearly 25% of these patients also exhibited arthritis. It is thus suggested that both CRP and uric acid levels should be monitored in patients with psoriasis.

Keywords CRP · Uric acid · Psoriasis

Introduction

C-reactive protein (CRP) is a member of the class of acute phase reactants, which is synthesized exclusively in the liver. Its levels have been shown to be raised by many folds following acute inflammation [1]. Accordingly, CRP has been suggested to be a marker of inflammation in several conditions including psoriasis, rheumatoid arthritis, tuberculosis, cancer, and myocardial infarction [2]. Rate of CRP synthesis and its secretion increases within hours of acute

inflammation and the value reaches peak level within 24–48 h. Main role of CRP has been shown to recognize potentially toxic autogenous substances that are released from the damaged tissue, and to bind and detoxify them from blood. Its levels have also been correlated with the extent of the disease [3]. These workers further observed that though CRP levels are reduced after 12 weeks of treatment, values do not return to normal.

Choi et al. [4] have shown that increased levels of uric acid can lead to a type of arthritis, which may be associated with psoriatic skin disease. They further suggested that hyperuricemia, in these patients, is a result of increased purine catabolism due to rapid epidermal cell turnover. These workers also reported that uric acid levels are elevated in psoriatic patients, with comparatively more rise in those who develop psoriatic arthritis. It has also been suggested that combined assessment of CRP and uric acid, in patients of coronary artery disease with low levels of other markers, provides incremental information for risk of further complications [5]. Due to paucity of data on serum CRP and uric acid levels in patient with psoriasis, and none from this part of the World, it was planned to study CRP and uric acid levels in patients with psoriasis before and after 12 weeks of therapy. Further, an attempt has also been made to assess the association of psoriasis and psoriatic arthritis.

Materials and Methods

Twenty-five (17 males and 8 females; mean age 35.8 years) new psoriatic patients having active disease, with surface involvement of more than 25% (labeled as group III), were studied for serum C-reactive protein (CRP) and uric acid levels before and after 12 weeks of treatment.

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Exclusion criteria were—patients having acute illness such as fever, joint pain, abdominal complaint, malignancy, history of chest pain, deep fungal or disseminated localized gonococcal infection, taking active systemic therapy, or those having arthritis (rheumatoid factor positive).

Detailed history and physical examination, including involvement of the body area according to the rule of nine, was done. Twenty-five age and sex matched normal healthy volunteers (group I), and 25 patients having skin disorders other than psoriatic lesions (group II) were studied for comparison, as controls. All the subjects, of the three groups, were investigated for routine laboratory investigations, which were found to be within the normal limits. Besides, serum total protein [6], blood urea [7], SGOT and SGPT [8], CRP by immuno turbidimetric method [9], and uric acid [10] levels were estimated using fully-automated clinical chemistry analyzer (Konelab 30i). Results were statistically analysed by Student's paired t-test for significance.

Results and Discussion

As shown in Table 1, mean serum total protein concentration in patients with various skin disorders other than psoriatic lesion (group II) as well as with psoriasis before treatment (group III) were found to be significantly lowered when compared with the normal controls (group I; $P < 0.05$). When compared with the respective mean values for group I, the mean values for blood urea and SGPT were found to be significantly raised in patients with group II while the mean value for SGOT was found to be raised in patients of group II as well as group III. These observations suggest some degree of liver dysfunction in patients suffering from various skin disorders including psoriasis. It is well known that liver is a main organ that regulates metabolism and homeostasis of the body, and that the inflammatory conditions like psoriasis cause progressive liver damage and alter liver functions [11].

The mean value for CRP was found to be increased by more than 20-folds in patients with psoriasis (Table 1). After 12 weeks of treatment, the value was found to be reduced from 44.4 ± 2.16 to 28.0 ± 1.54 mg/l ($P < 0.001$). It was interesting to observe that reduction in CRP concentration after 12 weeks of treatment, was there in all the patients studied (Fig. 1). The mean value after 12 weeks of treatment, in patients with psoriasis, though was found to be reduced as compared to the pretreatment value; it however, remained significantly higher than the mean values for the other two groups ($P < 0.05$). CRP is an acute phase protein and its levels are known to be increased in various inflammatory conditions including psoriasis, rheumatoid arthritis,

Table 1 Serum total protein, blood urea, SGOT, SGPT, C-reactive protein (CRP), and uric acid levels in control subjects (group I), patients with skin disorders other than psoriatic lesion (group II), and psoriatic patients before treatment (group III)

Parameters	Group I	Group II	Group III
Serum protein (g/dl)	6.5 ± 0.08	$6.0 \pm 0.08^*$	$6.0 \pm 0.10^*$
Blood urea (mg/dl)	24.7 ± 0.90	$28.3 \pm 1.08^*$	24.0 ± 1.34
SGOT (U/l)	28.9 ± 1.08	$34.0 \pm 1.86^*$	$36.1 \pm 4.24^*$
SGPT (U/l)	32.2 ± 1.38	$39.0 \pm 1.98^*$	$31.3 \pm 2.66^{**}$
CRP (mg/l)	1.9 ± 0.24	$3.0 \pm 0.29^*$	$44.4 \pm 2.16^{*,**}$
Uric acid (mg/dl)	4.1 ± 0.19	$4.9 \pm 0.19^*$	$7.0 \pm 0.64^{*,**}$

Values are Mean $\pm$ SEM for 25 subjects in each group

* $P < 0.05$ when compared with group I

** $P < 0.001$ when compared with group II

myocardial infarction, and malignancy [1, 2]. It has been shown that CRP can be used as a blood marker to evaluate severity of the disease [3]. It has also been reported that residual inflammatory response persists despite treatment and that CRP with PASI (Psoriasis Area and Severity Index) can be used as a global index of disease severity [12]. Reduction in CRP level after treatment in all the patients of the present study, confirms that monitoring CRP level can serve as an important prognostic factor while assessing response to treatment.

Fig. 1 Serum C-reactive protein levels in patients with psoriasis before and 12 weeks after treatment

Fig. 2 Serum uric acid levels in patients with psoriasis before and 12 weeks after treatment

Mean serum uric acid concentration was also found to be significantly higher in patients with psoriasis when compared with the other two groups ($P < 0.05$; Table 1). In nearly 25% of these patients serum uric acid level was more than 10 mg/dl. After 12 weeks of treatment, mean value for serum uric acid was found to be significantly decreased ($P < 0.05$). Fall in serum uric acid was observed in nearly 80% of the patients (Fig. 2). Psoriasis is a disease with rapid epidermal cell turnover, which in turn may result in hyperuricemia. Eroglu et al. [13] have shown elevated levels of both, CRP and uric acid in patients with cardiac syndrome X. They suggested that there can be a rise in CRP and uric acid in patients having inflammatory disorder involving a large area of the body. It has also been reported that higher levels of CRP increase blood pressure by reducing nitric oxide production in endothelial cells, which in turn may result in vasoconstriction.

As vasoconstriction impairs blood flow to various parts of the body including joints, it in turns causes hypoxia and compromised joint function that may lead to the development of arthritis in patients with psoriasis [14]. Leczinsky [15] reported nearly 20% onset of arthritis in patients with psoriasis. Even in the present study, there were nearly 25%

(6 out of 25) of the patients with serum CRP concentration above 50 mg/l. These were also the patients whose serum uric acid level was more than 9 mg/dl. Results of the present study thus, confirm that CRP and uric acid levels should be monitored in patients with psoriasis, and that psoriasis and psoriatic arthritis should be treated as a single disease entity with common inflammatory mediators and pathways.

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