A STUDY OF SERUM CERULOPLASMIN IN PSORIASIS AND ITS CORRELATION WITH DISEASE SEVERITY

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ABSTRACT: Psoriasis is a common chronic persistent inflammatory skin disorder distinguished by hyperproliferation and reduced differentiation of keratinocytes. 2-3% of the population is affected by this inflammatory skin disease. Biomarkers could be relevant for distinction between the different clinical variants of the disease, for assessment of disease activity and severity, and for prediction of the outcome of a therapeutic intervention for psoriasis. In the present study, serum ceruloplasmin levels were estimated in patients with psoriasis and a group of healthy controls. In addition, the correlation between ceruloplasmin levels and the severity of the disease was evaluated. The mean ceruloplasmin levels of cases was found to be higher compared to controls and it was statistically significant (p<0.0005). There was a mild negative correlation between ceruloplasmin levels and Psoriasis Area and Severity Index (PASI). In conclusion, ceruloplasmin could serve as a biomarker of psoriasis but not as a marker of psoriasis severity.

Key words: Psoriasis, ceruloplasmin, serum, inflammation, PASI

INTRODUCTION

Psoriasis is a common chronic recurrent inflammatory skin disorder characterized by hyperproliferation and reduced differentiation of keratinocytes [1]. It is one of the most common inflammatory skin diseases affecting 2-3% of the population [2]. The majority of the current data about psoriasis is about immune system elements and role of inflammation in the pathogenesis. The development of psoriasis is associated with genetic predisposition which has a basis of T cell activation secondary to dermal inflammation with abnormal keratinocyte proliferation [3]. Although the systemic nature of psoriasis often remains unrecognized, the inflammatory processes involved may be associated with the development of co-morbidities, which have a significant impact on the patient's health and quality of life [4]. Increased levels of biochemical markers of inflammation and lipid peroxidation have been reported in subjects with psoriasis, which suggests a relationship between psoriasis, inflammation and oxidative damage [5]. Hence, Psoriasis has become a model disease for scientists working on chronic inflammation and autoimmunity [2]. Biomarkers could be relevant for distinction between the different clinical variants of the disease, for assessment of disease activity and severity, and for prediction of the outcome of a therapeutic intervention for psoriasis [6].
Ceruloplasmin (CP) is a copper-containing alpha-2-glycoprotein with a molecular weight of approximately 132 kDa [7]. It is an acute phase reactant that normally carries 95% of plasma copper [8]. However, the physiologic functions appear to be varied. The known functions of ceruloplasmin include copper transportation, iron metabolism, antioxidant defence, and involvement in angiogenesis and coagulation [9]. So far, very few reports [10-12] are available on the status of ceruloplasmin in patients with psoriasis. Therefore, in the present study ceruloplasmin levels were assessed in the sera of patients with psoriasis. In addition, an attempt was made to correlate ceruloplasmin levels in the patients with a disease severity since it is a valuable tool to assess severity of the illness.

MATERIALS AND METHODS

Sampling: Thirty patients with psoriasis above the age of eighteen years were included in the study. Thirty healthy age and sex matched controls were also studied over this period. Patients with acute febrile illness, active systemic diseases/events such as arthritis, hepatic disease, renal disease, malignancies, pregnancy etc and patients on systemic therapy or photo therapy for psoriasis for the past one month were excluded from the study.

Clinical Assessment: All participants were subjected to a detailed clinical examination. The degree of severity of psoriasis was clinically assessed by Psoriasis Area and Severity Index (PASI) score for each patient.

Blood Sampling: Blood was collected by venipuncture from the patients and controls. Serum was separated by centrifugation and stored at -20°C until the estimation.

Assay: Ceruloplasmin was estimated by diamine oxidase method [13].

Statistical Analysis: The statistical significance was evaluated using Student’s ‘t’ test and Pearson’s correlation.

RESULTS

Software SPSS version 17 was used for statistical analysis. Data was analysed using Student’s un-paired ‘t’ test and Pearson’s correlation coefficient. P<0.05 was considered statistically significant. All values were expressed as Mean ± Standard Deviation (SD). The mean ceruloplasmin levels of cases was found to be higher compared to controls and it was statistically significant (p<0.0005) as shown in table 1.

There was a mild negative correlation between ceruloplasmin levels and PASI but it did not differ significantly (r = - 0.1292, p = 0.496).

![Table 1: Comparison of ceruloplasmin levels between psoriasis and controls](image)

<table>
<thead>
<tr>
<th>Serum Sample</th>
<th>Number (n)</th>
<th>Mean± SD</th>
<th>Mean Difference</th>
<th>p-value</th>
<th>95% Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>30</td>
<td>57.25 ± 41.159</td>
<td>16.091</td>
<td>&lt;0.0005</td>
<td>8.32698 - 23.855</td>
</tr>
<tr>
<td>Controls</td>
<td>30</td>
<td>16.6961±13.137</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

In the present study, we found that in psoriasis, serum ceruloplasmin levels are significantly elevated. Psoriasis is a chronic inflammatory systemic disease in which inflammation plays an important role in pathogenesis [14]. Serum ceruloplasmin level may be a complimentary factor associated with inflammatory conditions [15]. It also plays an important role as a circulating scavenger of oxygen derived free radicals [16]. As a systemic inflammatory disease, more specific and sensitive markers are thought to be beneficial in monitoring the systemic inflammation observed in psoriasis where they can be used to predict the developmental risk of secondary inflammatory diseases and psoriatic co-morbidities [3]. Systemic inflammatory markers which are known to be raised in patients with psoriasis when compared to healthy subjects include the C-reactive protein, erythrocyte sedimentation rate (ESR), fibrinogen levels, vascular endothelial growth factor (VEGF), beta defensins, and S100 proteins [6]. Patients with psoriasis also exhibit increased circulating markers of oxidative stress and higher neutrophil function compared to controls [17]. Hence, it has been suggested that increased reactive oxygen species (ROS) production and compromised function of antioxidant system may be involved in the pathogenesis of this disease.
Increased ceruloplasmin concentrations in psoriasis may indicate an acute phase-type response and/or it may reflect the scavenging action of ceruloplasmin which prevents the accumulation of highly toxic hydroxyl radicals produced during inflammation or exposition of many drugs [18]. This study showed a mild negative correlation between ceruloplasmin levels and PASI but it did not differ significantly suggesting that serum ceruloplasmin level has no prognostic significance for the worsening of psoriasis. In conclusion, ceruloplasmin could serve as a biomarker of psoriasis but not as a marker of psoriasis severity.

REFERENCES