Psoriatic Patients and Salivary Components

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Abstract

Introduction: Salivary analysis of oral inflammatory and local humoral immune response could give additional information about the role of salivary components in patients with psoriasis. Saliva is an accessible medium and a highly efficient non-invasive diagnostic tool. Immunoglobulin (Ig) A is the most important immunoglobulin in saliva and serves as a main immunological defence of mucosal surfaces. Results of previous studies on salivary IgA in psoriasis are inconclusive and contradictory, probably due to the different clinical types of psoriasis. ***Aim:*** The aim of this study was to evaluate the oral inflammatory and humoral immune response in patients under immunosuppressive therapy for psoriasis, and also to examine the relationship between salivary biomarkers and the severity of psoriasis. ***Methods:*** Samples of unstimulated saliva from 12 patients with psoriasis vulgaris and 15 control subjects were analysed for salivary total protein, IgA, IgG, C-reactive protein (CRP) and haptoglobin, using a colorimetric method, radial immunodiffusion and an immunoturbidimetric method. ***Results:*** In patients with psoriasis vulgaris, a statistically significant decrease of CRP was found compared to the controls. An insignificant decrease of IgA and elevation of haptoglobin were also observed. Statistical analysis using the Pearson correlation coefficients showed a significant negative correlation between total protein and IgA. ***Conclusion:*** The findings suggest that psoriatic patients with Psoriasis Area Severity Index >10 under immunosuppressive therapy had a decreased level of CRP and IgA and could be at higher risk of microbial infection, which could act as a trigger for psoriasis or for its recurrence.

Key Words: Saliva, C-Reactive Protein (CRP), Immunoglobin A (IgA), Haptoglobin, Psoriasis

Introduction

Psoriasis is a chronic and recurrent inflammatory skin disease affecting 1-3% of the world population [1]. The inflammatory response represents a fundamental ability of the organism to protect itself from infectious agents and from injury [2]. The worsening of the disease seems to be linked to the enhancement of the inflammatory response and to the imbalance between neutrophil activation products and their inhibitors [3]. Nowadays, psoriasis is considered a Th1-mediated inflammatory disease [4].

Infections of the upper respiratory tract are recognised as a triggering stimulus for psoriasis [5], and continuing, subclinical infections, which may result from lowered immunity, might be responsible not only for relapse but also for the onset of psoriasis [2].

Studies of salivary immunoglobulin (Ig) A in the oral cavity, the speed of secretion of salivary IgA and lysozyme in psoriatic patients without oral lesions are inconclusive and contradictory, probably due to the different types of psoriasis [6,7]. Some studies have shown increased salivary IgA

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level after moderate regular exercise that was associated with decreased upper respiratory tract infections symptoms and the duration of the sickness [8].

The serum levels of C-reactive protein (CRP) and haptoglobin are elevated in several inflammatory diseases. Serwin *et al.* (2006) observed that CRP concentrations are increased in active psoriasis [9]. There are few data in the literature about salivary determination of the level of proteins concerned with immune defence in psoriatic patients. The alteration of the oral inflammatory and local immune response could be of interest in patients with psoriasis with no oral manifestation of the disease in order to determine the difference in the protein levels in saliva.

Aim

The aim of this study was to evaluate the salivary inflammatory (CRP, haptoglobin) and humoral immune responses (IgA, IgG) in psoriatic patients, before treatment.

Methods

1. Patients

Thirty-two consecutive patients with psoriasis were recruited from the Department of Dermatology and Venereology, Medical University, Sofia, Bulgaria. The diagnoses were confirmed with histology. The demographic and clinical characteristics of the studied individuals are shown in *Tables 1* and *2*.

Table 1. *Demographic data of the population studied*

Groups	**Sex (n)**		**Age (years)**
	Male	**Female**	**Mean ± SD**
Control	9	22	41.9±18.4
Psoriasis vulgaris	18	14	41.5±14.24

Table 2. *Clinical characteristics of the population studied*

Type of psoriasis:	**Patients (n)**
Gutaten psoriasis	2
Psoriasis palmoplantaris	4
Plakaten psoriasis	6
Psoriasis vulgaris	20
PASI score:	
<10	21
>10	11

Data on age, smoking habits, family history, duration of psoriasis, evidence of arthropathy and other diseases were recorded. The disease severity was assessed using the Psoriasis Area Severity Index (PASI) [10].

Thirty-one healthy individuals, free from skin disease, were included as a control group. In order to exclude suspicious mucosal lesions, acute and chronic periodontal diseases, each healthy individual underwent a facial and oral examination performed by a surgeon and a dentist. The controls had not taken any medication for one month prior to the study. None of the subjects had a history of any chronic disease, prior malignancy, immunodeficiency and autoimmune disorders.

Ethical approval was gained for the study prior to its commencement. All patients and controls signed an informed consent prior investigation.

2. Collection of the saliva samples

Whole unstimulated salivary probe was collected as described by Dawes and Weatherell (1990) [11]. Salivary samples (approximately 5 ml) were collected into 15 ml test tubes for five minutes between 7.30 a.m. and 8.30 a.m. Subjects were asked to refrain from eating, drinking, and smoking for at least one hour before the collection. The most recent oral hygiene procedure had been performed the previous night. The specimens were stored at -70°C until their analyses.

3. Determination of IgA and IgG in saliva

The levels of IgA and IgG were assessed by radial immunodiffusion with high sensitivity (Immunotest kits, Sofia, Bulgaria).

4. Determination of haptoglobin and CRP

The levels of haptoglobin and CRP in saliva were determined by an immunoturbidimetric method using a COBAS Integra 400 analyser (Roche Professional Diagnostics, Rotkreuz, Switzerland). The lower detection limit for haptoglobin was 0.102 g/l and for CRP 0.85 mg/l.

5. Determination of total protein

Total protein was determined by colorimetric method also using COBAS Integra 400 (lower detection limit 0.8 g/l).

6. Statistical analysis

Statistical analysis was performed using statistical software (SPSS, SPSS Inc, Chicago, USA). The Mann-Whitney U test was used for comparing the

data between tested groups and P values lower than 0.05 were considered statistically significant. Pearson correlation coefficients were calculated to assess the possible association between tested parameters.

Results

1. A significant increase was found in salivary levels of total protein, IgG and CRP between psoriatic patients and the control group *(Table 3).*

Table 3. *Alterations of salivary proteins in psoriatic patients. Results are expressed by median and range (min÷max); number of studied individuals is given in parenthesis (Mann-Whitney U test)*

Group parameters	Psoriatic patients (n=32)	Control (n=31)
Total protein (g/l)	1.65* (0.3÷5)	1.2 (0.10÷3.5)
IgA (mg/l)	79 (2÷176)	83 (2÷165)
IgG (mg/l)	31* (9÷402)	22 (9÷54)
Haptoglobin (mg/l)	10 (10÷80)	20 (0÷40)
CRP (mg/l)	0.170* (0.03÷0.26)	0.03 (0÷0.310)

**P<0.05, compared to controls*

2. It was observed that psoriatic patients having PASI >10 had a tendency to higher values of IgG and CRP and low levels of IgA compared to the patients with PASI <10 *(Table 4).*

3. Values for CRP and IgA showed significant correlation using the Pearson correlation coefficients *(Table 5).*

Table 5. *Statistically significant correlation coefficient between tested parameters*

Correlation pair	Pearson correlation coefficient
IgA/CRP	0.506*

**P<0.05*

Discussion

Clinical studies on the relation between oral or systemic disease and salivary components are usually complicated by the difficulties in standardising sampling methods and laboratory tests, which contribute to a diversity of findings. Salivary IgA is the most important immunoglobulin in saliva and serves as a main immunological defence of mucosal surfaces.

Results of previous studies on salivary IgA among patients with psoriasis are contradictory. Elevated levels of IgA in whole saliva were detected by Syrjanen *et al.* (1983) [12]. On the other hand, Gasior-Chrzan *et al.* (1992) found that salivary IgA concentrations were not significantly different from the controls [6]. Low levels of salivary IgA in psoriatic patients have also been reported [7].

In the present study, the salivary level of IgA in psoriatic patients was not significantly different from the control group.

We observed that patients with a PASI >10 had a tendency to lower levels of IgA compared to the patients with a PASI <10 *(Table 4).* This finding suggests that psoriatic patients with a PASI >10 might be at higher risk of microbial infection and that infection could act as a trigger for psoriasis. Lowered oral immunity could lead not only to streptococcal infection (its superantigen is consider a triggering factor for psoriasis) but also to other infection.

Kugler *et al.* (1992) [4], Gleeson *et al.* (1995) [13], and Evrin *et al.* (2005) [14] have indicated no age-significant effect on salivary IgA and serum

Table 4. *Alterations of salivary proteins in psoriatic patients with PASI<10 and PASI>10. Results are expressed by median; number of a studied individuals is given in parenthesis*

Group parameters	Psoriatic patients PASI<10 (n=21)	Psoriatic patients PASI>10 (n=11)	Control (n=31)
Total protein (g/l)	1.7	1.7	1.2
IgA (mg/l)	92	56	78
IgG (mg/l)	30.5	42.5	22
Haptoglobin (mg/l)	10	10	10
CRP (mg/l)	0.150	0.210	0.03

CRP in adults between 15 and 70 years old. Despite the unmatchable age of the patients and controls, we suggest that our findings are due to the disease itself, not to the age.

Chodorowska *et al.* (2004) observed increased plasma levels of CRP in the active stage of psoriasis [15]. Serwin *et al.* (2006) also confirmed these data [9]. Rocha-Pereira *et al.* (2004) proposed that CRP has prognostic significance for the worsening of psoriasis [3]. In the present study, we found a statistically significant increase of salivary CRP associated with the inflammatory nature of the psoriasis.

Haptoglobin is an acute-phase reactant, known to be produced mainly in the liver. This protein was also detected in the cytoplasm of normal epidermal Langerhans cells and it can prevent their functional maturation. Li *et al.* (2005) found that haptoglobin protein stained positively in some keratinocytes of patients with psoriasis [16]. In the patients in the current study with psoriasis, the salivary haptoglobin level had a tendency to be similar compared to controls according to median. However, we found statistical significance difference on the level of haptoglobin, according to mean values *(Table 6).* We suggest that the increased salivary levels of haptoglobin could be related to a direct transudation from the blood or to a local production in Langerhans cells and keratinocytes of oral mucosa. It could be considered as a local defence mechanism against the psoriasis.

Table 6. *Salivary haptoglobin in psoriatic patients and controls. Results are expressed by mean ± S; number of a studied individuals is given in parenthesis*

Group parameters	**Psoriatic patients (n=32)**	**Control (n=31)**
Haptoglobin (mg/l)	26.9±24.6*	15±12.9

**P<0.05, compared to controls*

Conclusion

Our findings show that in the relatively small group of psoriatic patients with PASI >10 that was studied, there was a tendency to high levels of CRP and IgG and low levels of IgA compared to patients with PASI <10.

The practical use of this combination of markers deserves further investigation concerning the evaluation of oral mucosal immunity in psoriatic patients before, during and after immunosuppressive treatment.

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