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Soluble Intercellular Adhesion Molecule-1 and Procollagen III Peptide are Reliable Markers of Disease Severity in Psoriasis

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Levels of soluble intercellular adhesion molecule-1 (sICAM-1) and procollagen III peptide (PIIIP) were measured respectively by enzyme immunoassay (EIA) and radioimmunoassay (RIA) methods in sera from 14 patients affected with psoriasis. The same determinations were also performed on suction blister fluids (BFs) obtained from lesional and non-lesional skin. Fourteen normal subjects were used as controls. Significant correlations were found between the serum levels and psoriasis area and severity index (PASI), ($R = 0.62$ for sICAM-1 and $R = 0.73$ for PIIIp, respectively). Of the PASI components, infiltration and erythema represented the variables most closely related to PIIIP ($R = 0.85$; $R = 0.72$ respectively). Differently from PIIIP, whose levels were significantly lower in the sera than in skin BFs (serum: median value 1.05, range 0.7–2.3 vs. lesional skin fluid: 11.8, 4.8–30 U/ml), sICAM-1 molecules were found predominantly in the sera (serum: median 316, range 117–579 vs lesional skin fluid: median 70, range 31–252 ng/ml). These data cannot exclude that sICAM-1 molecules detected in suction BFs may derive from serum contamination. *Key words: sICAM-1; PIIIP; psoriasis; blister fluids; serum; PASI.*

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Recent advances in our understanding the pathomechanisms of psoriasis are supported by the increasing knowledge of several soluble molecules synthesized and released by different cells(1). In this regard, we studied the sICAM-1 (soluble intercellular adhesion molecule-1) levels in involved (ISBFs) and uninvolved (USBFs) skin blister fluids (BFs) and sera of 14 patients affected with psoriasis. The procollagen III peptide (PIIIP) levels on the same samples were measured to study possible fibroblastic involvement in this disease. The clinical usefulness of the previous determination was evaluated correlating the results found with the commonly employed parameters of PASI score.

PATIENTS AND METHODS

Fourteen patients with active (non-arthropathic) psoriasis were studied (13 females and 1 male, median age 41, range 15–72 years) and 14 healthy volunteers (12 females and 2 males, median age 43, range 21–50). Twelve of the 14 patients were affected with plaque-type psoriasis, 1 with suberythrodermic psoriasis and 1 with pustular psoriasis. The median PASI of 13 patients was 11.4; range 3.0–40.5. None of the patients had ever received methotrexate or had liver dysfunction. The patients had received no treatment for at least 10 days before enrolment. Suction blisters were obtained both from lesional skin (ISBFs) (plaque) of 3–5 cm in diameter or edge of larger plaques) and from unaffected skin (UBSFs) (10–15 cm from the lesion) in all patients and from normal skin (NSBFs) in 5 out of 14 controls, by the Kiistala methods (2). Serum samples were obtained from all patients and controls studied. The methods and technical data are as follows:

Table I.

Test	Producer	Method	Sensitivity	Sample (µl)	Dilution
Serum					
sICAM	T Cell Sci.	ELISA	0.3 ng/ml	25	1/100
PIIIP	Behring	RIA	0.1 UPIIIP/ml	20	1/1
Fluid					
sICAM	T Cell Sci.	ELISA	0.3 ng/ml	25	1/100
PIIIP	Behring	ELISA	0.1 UPIIIP/ml	20	1/2

Statistical analysis

The results are expressed as median and range values. Accordingly, statistical comparisons were calculated by non-parametrical methods: Kruskal-Wallis or Rank Wilcoxon or Spearman Rank correlation tests were used as necessary.

RESULTS

The sICAM-1 and PIIIP levels in blister fluids (BFs) and sera from psoriatic patients and controls are shown in Fig. 1a, 1b. Serum levels of sICAM in 14 psoriatic patients (median 316 ng/ml; range 117–579), were statistically higher than in the controls (median 234 ng/ml; range 160–240; $p = 0.032$). With regard to the sera, in both patients and controls , lower sICAM-1 levels were detected in the USBFs (median 31.5 ng/ml; range 10–223; $p = 0.00002$, in the ISBFs (median 70 ng/ml; range 31–252; $p = 0.00001$) and in NSBFs (median 30 ng/ml; range 27–58; $p = 0.009$). The sICAM-1 concentrations in the ISBFs were significantly higher than in the USBFs ($p = 0.002$) or in NSBFs ($p = 0.005$). No statistical difference between the USBFs and the NBSFs sICAM-1 was found. Direct correlations were observed between the levels of sICAM-1 in sera and ISBFs ($r = 0.82$; $p = 0.000$.) as well as between ISBFs and USBFs ($r = 0.89$; $p = 0.00001$). A statistically significant correlation between serum sICAM-1 levels and the PASI score was also noted ($r = 0.62$; $p = 0.03$). PIIIP levels in the BFs and sera from psoriatic patients and controls are shown in Fig. 1b. PIIIP serum measured in the 14 psoriatic patients (median 1.05 U/ml range 0.7–2.6) were significantly lower than those of ISBFs (median 11.8 U/ml; range 4.8–30; $p = 0.000007$) or of USBFs (median 8.3 U/ml; range 1.7–30; $p = 0.00002$). The control sera also showed lower PIIIP levels (median 0.9 U/ml; range 0.6–1.0) when compated with NSBFs (median 8.6 U/ml; range 4.1–12.1; $p = 0.008$). In the ISBFs, a significant increase in the PIIIP levels was noted as compared with the USBFs ($p < 0.05$) and, although not statistically significant, to the NSBFs. Also in patients' sera, the PIIIP levels were significantly higher than in the control sera ($p = 0.035$). Direct correlations between the PIIIP serum levels

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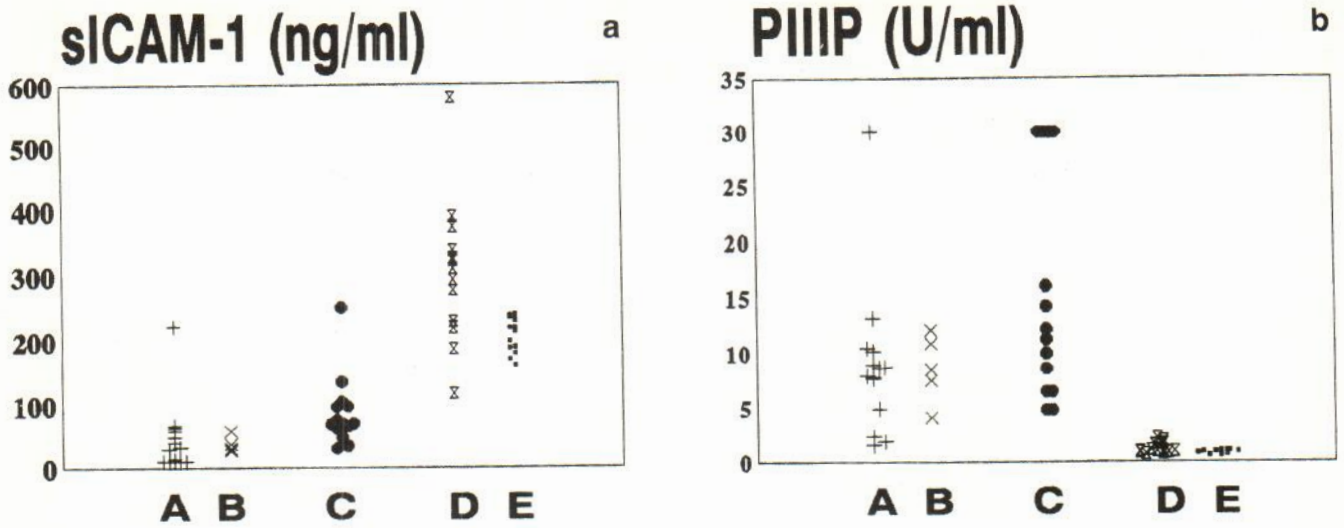

Fig. 1a, b. A = uninvolved skin; B = normal skin; C = involved skin; D = psoriasis serum; E = control serum.

and PASI score ($r = 0.73$; $p = 0.005$) and between the PIIIP and grade of erythema ($r = 0.72$; $p = 0.03$) and PIIIP and grade of infiltration ($r = 0.85$; $p = 0.0001$) were found.

DISCUSSION

ICAM-1 is a membrane glycoprotein (90–114 KDa MW) which plays a central role in several cell-cell interactions (3). Various cell types constitutively express ICAM-1 or may be induced to express it by cytokines (3). ICAM-1 may also be released into the fluids (4): in fact, the sICAM-1 serum levels are increased in many diseases characterized by an activation of phlogistic mechanisms (5). In our study, higher sICAM-1 levels, both in psoriatic and in control sera, were demonstrated, together with a direct correlation of sICAM-1 serum levels and PASI score. Similar data have been recently reported by Schopf R. E. et al. who did not study sICAM-1 levels in BFs (5). The significantly lower sICAM levels in ISBFs and in USBFs, as in NSBFs, is not surprising. In fact, sICAM-1, released in greater amounts at the level of the skin phlogistic focus, due to its high molecular weight (> 30 KDa) (6), can only partially penetrate into the BFs and is collected in the bloodstream.

PIIIP serum levels of psoriatic patients and controls were significantly lower than skin BF. However, higher serum PIIIP levels vis-à-vis control sera, were observed in the psoriatic patients. A significant direct correlation between PIIIP serum levels and PASI score was found. Other correlations between the PIIIP serum levels and the lesion grade of erythema or infiltration were observed. Serum PIIIP amounts can derive partly from interstitial skin. The higher PIIIP levels found in the ISBFs as compared with control BFs indicate a greater local fibroblastic activity, in partial agreement with previous reports (7). In ISBFs, higher PIIIP levels were found as compared with the USBFs ($p < 0.05$) and also vs. NSBFs ($p = NS$). However, no differences were observed between the USBFs and the NSBFs. These data suggest that serum sICAM-1 and PIIIP may be considered possible markers of disease severity in psoriatic patients. Further studies are warranted to verify in which cases they may be selectively better utilized.

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