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ORIGINAL ARTICLE

Assessment of Galectin-3 Levels in Psoriasis Vulgaris

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ABSTRACT

Background: Galectin-3 is a one of the galectin family and produced by T-lymphocytes and has an important role in the inflammation process.
Aim: the aim of this study was to determine the levels of serum galectin-3 in patients with psoriasis Vulgaris, a T-cell-mediated inflammatory disease, and investigate the correlation between these levels and activity of disease.
Material and Method: this study included thirty-six patients with psoriasis Vulgaris and 30 healthy subjects. The psoriasis area and severity index (PASI) were calculated and recorded for every patient. The patients were divided into three groups: group I (mild), II (moderate) and III (Severe) according to the PASI scores. ELISA analysis was used to analyze the level of serum galectin 3.
Results: level of serum galectin-3 in psoriasis Vulgaris patients was significantly lower than the control group (p=0.001). there was a negative correlation between level of serum galectin-3 and PASI scores (Spearman's rho=-0.749, P<0.001).
Conclusion: the level of serum galectin-3 is considered an important factor in psoriasis Vulgaris etiopathogenesis and could be used as a reliable indicator for exacerbation during follow-up.
Keywords: PASI score; Psoriasis; galectin 3

INTRODUCTION

Psoriasis of the skin is chronic, common and relapsing is an inflammatory and proliferative disease. The pathogenesis represents combination of genetic, environmental and immunological factors T cell-dependent inflammatory and autoimmune process plays an important role.[1-4]Galectins considered one of protein family with a small molecular weight and has a role in cell growth and activation. Galectin-3 (Gal-3), one of this family, is about 30-kD is a galactose-specific protein of molecular weight. [5]Recently, many studies showed that galectins play a important role in homeostasis and inflammation of immune cells [6]. Galectin-3, which is one of the galectin family, is a pro-inflammatory protein and plays a role in T cell-mediated inflammation. It is found especially in macrophages, fibroblasts, tumor cells, epithelial cells and activated T cells [7].The aim of this study was to determine the levels of serum galectin-3 in patients with psoriasis Vulgaris, a T-cell-mediated inflammatory disease, and investigate the correlation between these levels and activity of disease.

MATERIAL AND METHODS

The Patients of the study were chosen from the outpatient clinic of Dermatology and Venereology Department, Zagazig University Hospital, Egypt, during the period from May 2018 to December 2018 after obtaining the approval of the research ethics committee of Zagazig University Hospital. 36 patients with psoriasis clinically and histopathologically (16 females, 20 males) were included. The control group consisted of 30 healthy volunteers (15 female, 15 male). Patients with systemic disease, pregnant women, smokers, systemic psoriasis treatment, were excluded from this study. All patients and controls were informed verbally and in writing, and local Ethics committee approval was received. Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.Dermatological examinations of patients and psoriasis area and severity index (PASI) were scored. Patients were classified according to their PASI values; Group 1(mild): PASI <10, Group II (moderate): PASI: 10-19.9 and Group III (severe):

PASI≥20 [8]. Blood samples were taken from the peripheral vein using a 25-gauge needle. Blood samples were sent to the laboratory by giving a code number. Laboratory staff did not know the diagnosis and the group of samples. Blood The samples were centrifuged at 3000 rpm for 5 minutes and measured at -20 ° C. until he hid. Levels of serum galectin-3 of all patients and volunteers were tested by ELISA method. It was measured according to the recommendations. All measurements were performed twice.Chi-square and Kruskal Wallis tests were used for comparing galectin-3 levels with the control group. Galactin-3 with PASI values Spearman's rho test was used for the level correlation. The level of significance was < 0.05.

RESULTS

The mean age of the patient group was 45.51 ± 10.65 (19-73), the mean age of the control group was 30.1 ± 9.5 (19-59). Baseline parameters of the studied groups are presented in Tables (1&2). The distribution of patients according to PASI values was as follows: 11 patients were in Group I (mild), 11 patients were in Group II (moderate) and 14 patients were in Group III (severe). The mean PASI value was calculated as 9.27 ± 9.19 (1- 36) .

Mean galectin-3 detected in psoriasis patients' value: 12.6±7.7. The mean level of serum galectin-3 in the control group was 19.8 ± 10.2. (Table 3). Serum galectin levels When the study and control groups were compared, the control group showed a highly significant levels of galectin-3 (p = 0.001). Galectin-3 levels, disease severity PASI

Table 1: Comparison of psoriasis and control subjects according to their age and BMI.

Variables	Psoriasis n=36		Control n=30		Difference b/w means	"t"	df	Sig
	Mean	SD	Mean	SD				
Age	41.1	13.2	38.5	11.4	2.5	0.971	92	P=0.334
BMI	27.3	3.8	26.3	2.6	0.98	1.443	92	P=0.152

Table 2: Comparison of categorical variables like sex, occupation, types of psoriasis.

Variables	Components	Psoriasis n=36		Control n=30		χ2	Sig.
		No	%	No	%		
Sex	Male	20	56.0	15	50.0	χ2 =0.006 df=1	P=0.936
	Female	16	44.0	15	50.0		
Occupation	Ministerial	5	14.0	3	10.0	χ2 =3.358 df=4	P=0.500
	Drivers	6	17.0	6	20.0		
	House wife	8	22.0	9	30.0		
	Professional	8	22.0	6	20.0		
	Others	9	25.0	6	20.0		

Table 3: Comparison of serum Galactin 3 between the control and psoriasis subjects.

Variable	Psoriasis	Control	Difference b/w means	"t"	Df	Sig
	Mean ±SD	Mean± SD				
Galactin 3	12.6 ± 7.7	19.8± 10.2	4.2	2.231	92	P=0.001

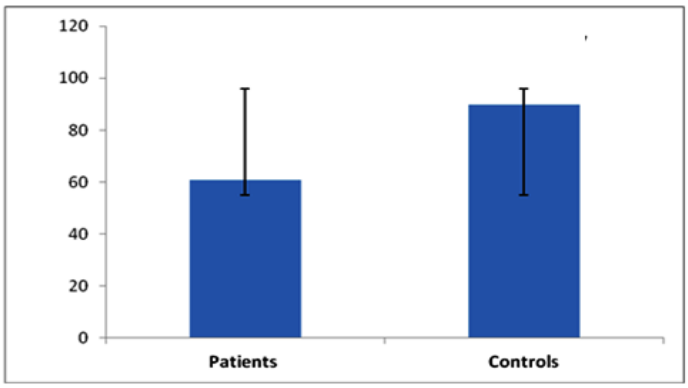

Figure (1): Comparing the studied groups regarding Galactin 3 serum level.

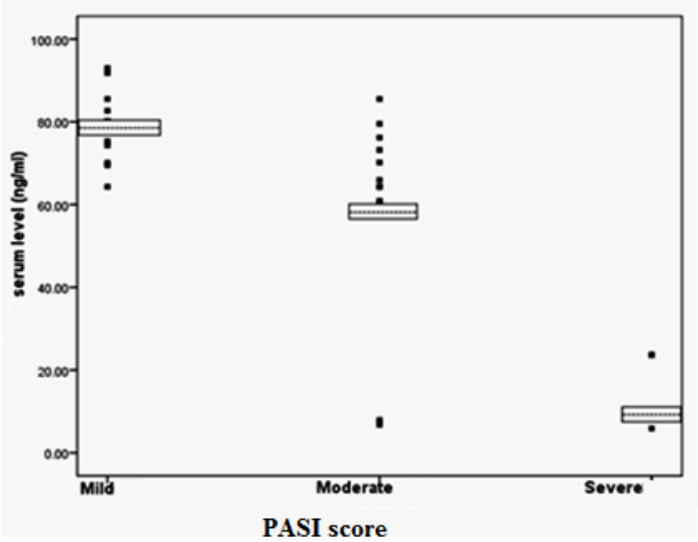

Figure (2): Serum Galactin 3 level in relation to different threshold values of Psoriasis severity.

DISCUSSION

Although many studies have been conducted on the pathogenesis of psoriasis, interaction between the adaptive and innate immune system, activation of T cells and the production of inflammatory cytokines have a dominant pathogenic role in psoriatic plaques [(9)]. A complex relationships between dendritic cells, macrophages, mast cells, neutrophils, and keratinocytes are essential. Treatment better understanding of pathogenetic mechanisms for new developments.[(10)]Galectin-3, a member of the galectin family, which has been brought up in recent years due to its effects on inflammation and immune homeostasis.[(11)] It is a protein with a strong proinflammatory effect. Especially in macrophages, fibroblasts, tumor cells, epithelial cells and activated T cells secretion through exocytosis has been shown to play a role in activated T lymphocyte proliferation. Galectin-3 plays a role in acute inflammation as well as chronic inflammation It is shown [(12)]. This protein NADPH-oxidase activation produces a very strong pro-inflammatory signal through the production of superoxide from neutrophils, monocyte, and macrophage chemotaxis, interleukin-1 production.It also plays a role in the adhesion of neutrophils on the endothelium.[(13)]

In our study, the pathogenesis of psoriasis, which is a complex T cell-mediated disease, is veryimportant in both acute and chronic inflammation so,galectin-3 is thought to play a role.Many studies reported the importance of antiinflammatory signals that counterbalance the inflammatory response. Galectins were implicated in the negative regulation of the immune response, participating in processes such as immune cell proliferation [(14)], apoptosis [(15)], cellular adhesion, migration and modulation of the interactions between T cells and antigen-presenting cells [(16)].

Relatively few studies have examined the correlation between psoriasis and galectins. Galectin-3 and gal-4 were low in lesional psoriatic skin, [(17)]. Lacina et al. [(18)] studied the expression of galectin-1, -3, -7 and their glycolignads in psoriatic skin in comparison to normal skin. Comparison with normal epidermis showed that there was a lower galectin-3 expression in psoriatic epithelium. However, there was a strong expression of galectin-3 and galectin-3-reactive glycoligands in the capillary epithelia of psoriatic dermis. It was supposed that the psoriasis development could be related to the effects of galectin-3 and galectin-3-reactive glycoligands on dermal capillaries which cause capillary network rearrangement and inflammatory cells recruitment [(19)].

Shi et al [(20)], showed that epidermal galectin-3 expression was significantly down regulated in lesional skin only, not in non-lesional skin in psoriasis patients, nor in a group of diseases known as psoriasiform dermatitis, which clinically and histologically similar to psoriasis. The epidermal galectin-3 deficiency was sufficient to promote the psoriatic lesions development, as shown by more severe skin inflammation in galectin-3 knockout (gal3-/-) mice. They concluded that decrease of galectin-3 in keratinocytes in mice represent a potential diagnostic marker and important contributor to the psoriasis pathogenesis.

In our study, the levels of serum galectin-3 were lower in psoriasis patients compared to healthy individuals. In the study contrary to expectations, galectin-3 levels of the control group had a statistically significant level. Also, galectin-3 levels change with the severity of the disease.

Our data suggest that galectin-3 protein has a direct role in inflammation in psoriasis. However, our study limitation is that galectin-3 level was measured in serum and not in tissue.

Numerous studies conducted to elucidate the pathogenesis of psoriasis tissue levels of cytokines or enzymes with no difference in serum levels It is a known fact that it gives different results. Therefore similar studies at the tissue level will be useful to investigate the possible role of galectin-3 in the pathogenesis of psoriasis.

Conclusion

the level of serum galectin-3 is considered an important factor in psoriasis Vulgaris etiopathogenesis and could be used as a reliable indicator for exacerbation during follow-up.**No conflict of interest**

No financial disclosures

There is a supplementary figure(S1)

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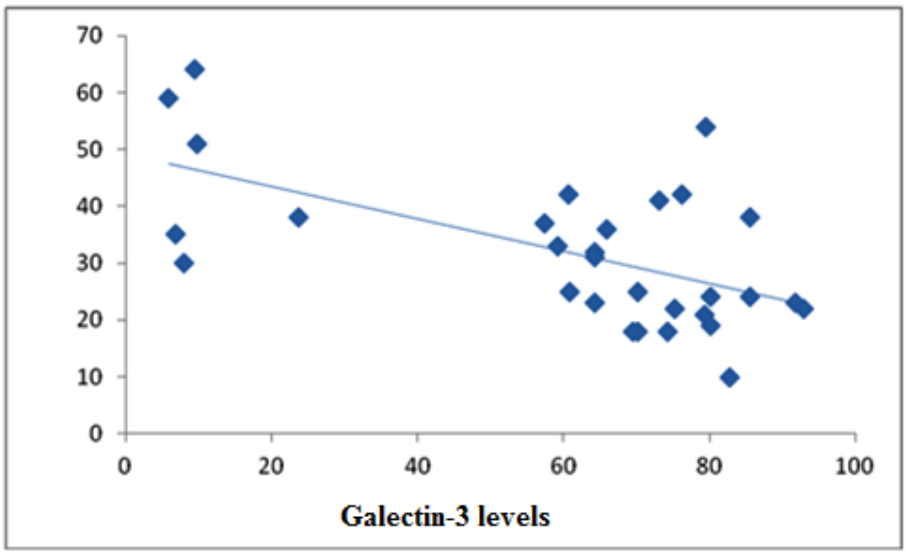

Figure (S1): Correlation between Galectin-3 serum level and individual PASI values.

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