

Novel potential marker of Acne Vulgaris

¹F.M.EL-Esawy, ¹A.M.Hamed, ²A.Adel EL-Fallah, and A.I.Omar*

¹Dermatology, Venereology and Andrology, Dept., Faculty of Medicine, Benha Univ., Benha, Egypt

²Clinical and Chemical Pathology, Dept., Faculty of Medicine, Benha Univ., Benha, Egypt

E-mail: ayai.omar991@gmail.com

Abstract

Background: Acne vulgaris is one of the most common skin diseases all over the world. The aim of this study was to measure serum levels of Thymosin β_4 in patients with acne vulgaris indicating its potential role as a novel biomarker in diagnosis of acne. Methods: This study included 20 patients with moderate acne vulgaris according to Global Acne Grading System (GAGS), presented to the Dermatology Department, Benha University Hospital, out patients clinics, in addition to 20 apparent healthy controls. All studied patients were subjected to history taking, dermatological examination and measurement of serum Thymosin β_4 . Results: the mean serum levels of Thymosin β_4 was higher in control group with insignificant difference than patients group, there was insignificant correlation between serum Thymosin β_4 level and age, sex, duration, onset and smoking history in AV patients. Conclusion:; serum Thymosin β_4 levels are higher in control group compared to AV patients, and it seems to have an essential role in the etiopathogenesis of this inflammatory skin disease, So it is considered to be a promising target in treating inflammatory diseases.

1. Introduction

Acne vulgaris is a common chronic inflammatory skin disease of the pilosebaceous units that affects the majority of the population at some point in their lifetime. Most people experience acne during adolescence, with >95% of teenage boys and 85% of teenage girls affected. Almost 20% of young people have moderate-to-severe acne, and as many as 50% continue to suffer from acne in adulthood targeting individuals' face, chest and back and characterized by formation of open and closed comedones, erythematous papules, pustules and less frequently by nodules or pseudocyst [1].

Acne pathogenesis is multifactorial with 4 primary factors that play a pivotal role in the formation of acne lesions: excess sebum production, abnormal keratinization, inflammation, and bacterial colonization of *Propionibacterium acnes* in the pilosebaceous unit. [2].

Thymosin beta 4 (T β_4) is a highly conserved, naturally occurring, water soluble regenerative peptide that is found in all tissues and in all cell types except red blood cells. It is also found in the blood and in other body fluids including tears, saliva, cerebrospinal fluid and wound fluids [3].

The aim of this study is to evaluate the role of Thymosin β_4 in acne vulgaris.

2. Patients and methods

This case-control study was conducted on 20 patients suffering from moderate acne vulgaris (Group A) and 20 apparently healthy individuals of matched age and sex as a control group (Group B). Patients were recruited from the outpatient clinic of Dermatology and Andrology Department of Benha University Hospitals between May 2019 and October 2019.

The study was approved by the local ethics committee of Benha Faculty of Medicine. Informed

consent was obtained from each individual before sample collection.

2.1. Inclusion criteria

- Moderate degrees of acne according to the Global Acne Grading system.
- Both genders were included.

2.2. Exclusion criteria

- Patients with any skin disease other than acne.
- Patient with any systemic diseases e.g (hepatic disease or renal disease).

All patients were subjected to Full history taking, Clinical examination, Laboratory investigations of Serum Thymosin β_4 had been measured in both patients and controls using enzyme-linked immunosorbent assay (ELISA) kits.

2.3. Statistical Analysis

The collected data were computerized and statistically analyzed using SPSS program (Statistical Package for Social Science) version 24.0. Qualitative data were represented as frequencies and relative percentages. Chi square test was used to calculate difference between qualitative variables. Independent T test was used to calculate difference between quantitative variables in normally distributed data in two groups. ANOVA *F*-test was used to calculate difference between quantitative variables in more than two groups in normally distributed data. Kruskal Wallis test was used to calculate difference between quantitative variables in more than two groups in not normally distributed data. Spearman's correlation coefficient used to calculate correlation between quantitative variables. Receiver operating characteristic (ROC) curve analysis was used to identify optimal cut-off values of marker with maximum sensitivity and specificity for prediction of the disease. The threshold of significance is fixed at 5% level (P-value).

3. Results

The present study was conducted on 20 patients suffering from moderate acne vulgaris (Group A) in addition, 20 healthy age and sex matched individuals were enrolled as a control group (Group B). The obtained data were analyzed using suitable statistical methods. There was non statistically significant

There was non significant correlation between serum Thymosin β 4 level and age among the studied patients. There was also non significant correlation between serum Thymosin β 4 level and duration of acne among the studied patients ($P = 0.61$ and $r = - 0.07$) (Table 2)

4. Discussion

The aim of this study was to estimate Thymosin β 4 serum level in moderate acne vulgaris cases. This was carried out through evaluation of 20 patients. Twenty healthy age and sex matched individuals were enrolled as a control group.

To the best of our knowledge, no published studies were conducted to assess thymosin β 4 levels in patients with acne vulgaris. According to the results of the present study, there was a statistically insignificant increase in serum thymosin β 4 level among control group compared to acne vulgaris patient group.

In the same direction with the results of the present study, Yeşilay et al. [4] found increased concentrations of T β 4 nearby the clots and tissue damage, which in turn contributes to wound healing, angiogenesis, and inflammatory response. It has been demonstrated that T β 4 has a number of important

difference between the two groups regarding age, sex and smoking (Table 1)

On multiple comparison of serum Thymosin β 4 level between patients and control groups, there was non statistically significance increase in Thymosin β 4 in Group B (824 \pm 206 ng/ml) when compared to Group A (794 \pm 320 ng/ml).

biological activities that appear to be useful for a wide range of medical conditions. It can reduce inflammation by downregulating some inflammatory molecules.

The results of the present study found a statistically insignificant increase in serum thymosin β 4 level among control group compared to patient's acne vulgaris. AV is predominantly characterized by a proinflammatory cytokine profile, causing the transition from stable clinical condition to AV. Therefore, it is considered that the more severe AV inflammatory reaction is, the lower level of thymosin β 4, this result was in agreement with Rutherford and Chung, [5] who found that serum thymosin β 4 levels were significantly lower in patients with chronic hepatitis B infection and liver failure which is considered as systemic inflammatory reaction and characterized by a predominantly proinflammatory cytokine profile. The magnitude of reduction of thymosin β 4 was closely related to the severity of the hepatic injury.

Badamchian et al. [6] also found that thymosin β 4 reduces lethality and downregulates inflammatory mediators concluding that the increase of serum thymosin β 4 is correlated to the severity of these diseases as in endotoxin-induced septic shock.

Table (1) Socio-demographic characters and smoking in the studied groups.

Variable		Group A (n=20)		Group B (n=20)		F	P
Age (in years)	Mean \pm SD	18.20 \pm 2.66		19.35 \pm 3.03		1.36	0.10
	Range	15 - 23		15 - 22			
Variable		No	%	No	%	χ^2	p
Sex	Female	14	70	12	60	1.55	0.23
	Male	6	30	8	40		
Smoking	No	18	90	18	90	1.	0.33
	Yes	2	10	2	10		

SD: Stander deviation, F: ANOVA test, χ^2 : Chai square test. NS: Non significant ($P > 0.05$), *: significant ($P \leq 0.05$).

Table (2) Correlations between Thymosin β 4 serum level and age of patients, duration of acne and acne severity score.

Variable	Thymosin β 4 Group A & B (n=60)	
	r	P
Age (years)	0.19	0.24NS
Duration (years)	-0.08	0.72 NS

r: Spearman correlation coefficient, NS: Non significant ($P > 0.05$), *: significant (≤ 0.05)

5. Conclusion

Thymosin β 4 seems to have an essential role in the etiopathogenesis of AV.

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