

Association between antistreptolysin-O serum level and chronic plaque psoriasis in Iraqi patients

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Objective Psoriasis is a disease characterised by T-cell-mediated hyperproliferation of keratinocytes initiated by antigen-presenting cells on the skin. Environmental factors including streptococcus infections and multiple genetic components may be responsible for the pathogenesis of the disease. This study was performed to assess the association between antistreptolysin-O (ASO) serum level and chronic plaque psoriasis.

Methods Serum level of ASO was measured in 45 doctor-diagnosed psoriatic patients with an age range of 10–50 years attending the dermatology outpatient clinic in Al-Hussein Medical City in Kerbala Province – Iraq during the period from March 2014 through July 2015. Psoriatic patients with chronic plaque type were selectively recruited to the study. Another 20 age- and gender-matched persons were chosen as healthy control group. Serum level of ASO was estimated in all patients and control group using enzyme-linked immunosorbent assay (ELISA).

Findings Data revealed a significantly increased serum ASO level in the chronic plaque-type psoriatic patients compared to the healthy control group (P -value < 0.05).

Conclusion The present study suggests that serum ASO level could be associated with the immunopathogenesis and/or susceptibility to this type of psoriasis.

Keywords chronic plaque psoriasis, anti-streptolysin-O

Introduction

Psoriasis is a chronic skin disease characterised by hyperproliferation of keratinocytes with different clinical types. A number of environmental factors are believed to contribute in the disease causation. *Streptococcus pyogenes* infection is thought to have a distinct relationship with the activation of psoriasis.¹ This finding was preceded by Norrind in 1955, who pointed out the occurrence of a streptococcal upper respiratory infection 1–2 weeks prior to the appearance of the skin lesions in about two-thirds of patients with psoriasis.² Following this observation, the presence of streptococci in the throat swab cultures of these patients, as well as the seropositivity of antistreptococcal antibodies were shown.

One of the suggested immunopathogenesis of psoriasis is the role of Th17 lymphocytes and its related cytokine action, which increase TGF- β production and mucosal defence during streptococcal skin infections. Streptococcal infections lead to production of interleukin 6, which along with TGF- β , results in a differentiation of Th17 at that location. Furthermore, the presence of IL-6 and TGF- β enhances neutrophils and mononuclear cells migration to the region. With the production of myeloperoxidase and elastase by neutrophils, skin lesion of psoriasis might be mediated.^{3,4}

The present study aims to investigate the association between serum antistreptolysin-O (ASO) level in patients with chronic plaque psoriasis by using ELISA technique.

Methods

Forty-five patients with chronic plaque psoriasis attending the outpatient clinic of Dermatology in Al-Hussein Medical City, Kerbala province/ Iraq, between March 2014 and July 2015, as well as 20 persons as healthy control group were recruited. Informed consent was obtained from each participant prior to

the study. Patients clinically diagnosed with chronic plaque psoriasis were selected as case group. Serum level of ASO was estimated in all patients and controls by ELISA technique using (Creative Diagnostics-USA) ELISA kit according to the instructions of the kit company.

Statistical Analysis

Statistical analysis was done by using statistical analysis software, Graph pad prism version 6. Student's t -test was used to calculate the significance of difference in mean serum levels of ASO between psoriatic patients and control group and F -test was used to compare variances of the two groups. In addition, R^2 -test was used to predict the association between ASO level and occurrence of chronic plaque psoriasis. A P -value < 0.05 was considered significant.⁵

Results

Data from the current study reveal a significant difference in the mean serum ASO level between patients with chronic plaque psoriasis and the control group; 21.4 IU/ml, versus 10.63 IU/ml, with (P < 0.05), as shown in Table 1. Upon analysis of results to predict the association of elevated serum ASO level with occurrence of chronic plaque psoriasis, the following data were obtained:

Overall, there was significant difference in ASO titre status between patients and control.

Discussion

It has been stated that latent or chronic tonsillitis and pharyngitis caused by streptococci are the main infections associated with psoriasis. Moreover, some streptococcal dermatitis and vulvovaginitis/balanoposthitis infections mostly seen

Table 1. Serum level of ASO in patients with chronic plaque psoriasis and control group

Subject	Number	ASO Mean (IU/ml ± SEM)	Statistical analysis*
Psoriatic patients	45	(21.4 ± 0.8521)	
Controls	20	(10.63 ± 0.8023)	
*Table Analysed			Unpaired t-test data
Column B			control ASO
vs.			vs.
Column A			test ASO
Unpaired t-test			
P-value		< 0.0001	
P-value summary		****	
Significantly different? (P < 0.05)		Yes	
One- or two-tailed P-value?		Two-tailed	
t, df		t = 7.757 df = 63	
How big is the difference?			
Mean ± SEM of column A		21.40 ± 0.8521, n = 45	
Mean ± SEM of column B		10.63 ± 0.8023, n = 20	
Difference between means		-10.77 ± 1.389	
95% confidence interval		-13.55 to -7.997	
R ²		0.4885	
F-test to compare variances			
F,DFn, Dfd		2.538, 44, 19	
P-value		0.0306	
P-value summary		*	
Significantly different? (P < 0.05)		Yes	

during childhood can induce psoriasis. Therefore, in acute exacerbations of guttate psoriasis, bacterial culture should be obtained from the patients. Determination of serum level of antibodies against streptolysin, a streptococcal exotoxin can also be performed. Among these, the most commonly used is antistreptolysin.^{6,7}

In our study, chronic plaque psoriasis patients were shown to have significantly higher ASO level compared to the control group ($P < 0.05$). These findings are consistent with many previous studies in this field.⁸⁻¹² All these studies showed significant differences ($P < 0.05$) with their respective controls.

In a previous study, association between streptococcal infections and psoriasis was suggested in 18(56%) of the 32 patients, 31% had a history of sore throat 1 to 3 weeks before the appearance of rash and 17(85%) of the 20 patients with acute guttate psoriasis (AGP).⁹

Increased levels of antibodies to streptolysin O were also found in the serum of patients in response to infection with haemolytic streptococcus groups A, C or G. Streptococcal infection usually leads to eruptive guttate psoriasis, and deterioration of other clinical forms of psoriasis.¹³ Another study found ASO titre raised in 60% of AGP patients versus 6.6% in healthy control group.¹¹ Another prospective cohort study described ASO serum level increased 10 times compared with their controls in chronic plaque psoriasis.¹²

In a retrospective cohort, about 30% of patients with chronic psoriasis stated that they had noted worsening of their disease in association with sore throat.¹⁴ An exacerbation of chronic plaque psoriasis only if streptococci were isolated 4 days or later after the onset of sore throat was observed.¹⁵ In addition, some studies proposed that the psoriasis patients

with high ASO titres had guttate psoriasis more frequently compared with patients with normal ASO titres.^{10,16}

Histopathological studies concerning examination of tonsils performed after tonsillectomies confirmed that streptococci could persist in these tissues and could eventually colonise them.¹⁷ The microorganisms' virulence factors like proteins M, Sfd1 and F1 are important regarding their role in tissue internalisation of streptococci and in triggering psoriasis.²

Furthermore, antigen-specific T-lymphocyte response against Group A streptococci increases in patients with guttate and chronic plaque psoriasis and the association between acute infections and guttate psoriasis has been reported in patients with chronic plaque type psoriasis.¹⁸⁻²⁰ Similarly, CD4+ and CD8+ cells isolated from psoriatic lesions were shown to be responsive to streptococcal peptidoglycan by proliferating and secreting interferon- γ .²¹

It was reported that streptococcal isolates from throat cultures of guttate psoriasis patients secreted streptococcus pyogenes exotoxin C which, by acting as superantigen, triggers polyclonal expansion of V β 2-bearing T cells.²²

The outcome of all of the abovementioned studies were similar and supportive of the findings obtained from the current study. However, our study's result is not in accordance with some previous similar works. These studies found that there is no significant difference in serum ASO levels in psoriasis patient and control group.^{19,23,24}

Conclusion

This study confirms an association between the increased serum level of ASO with the immunopathogenesis and/or susceptibility to chronic plaque psoriasis.

Recommendations

Further prospective cohort studies with larger sample size are needed to investigate the exact role of streptococcal infection and thus ASO level on elaborations of chronic plaque psoriasis.

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Competing Interests

None declared.

Conflicts of Interest

There is no conflicts of interest represented by financial or personal relationships with any other people or organizations regarding this work. ■

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