

Serum Uric Acid and Folic Acid Levels in Acne Vulgaris Patients

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Abstract

Many people are plagued with acne vulgaris, a common skin disorder that has a negative impact on their lives. Recently, the topics of serum folic acid and uric acid (UA) have come up. It is our goal to examine the uric acid levels in acne vulgaris patients with and without a history of folic acid deficiency in healthy individuals. The following are the research topics and procedures: The patients' group contained 60 people with mild or moderate acne vulgaris, whereas the control group included twenty healthy volunteers of the same age and sex. The worldwide acne grading system was used to determine the severity of the acne (GAGS). All individuals had their serum folic acid and uric acid tested using ELISA as well as a colorimetric method. Results: There was no statistically significant difference in age, gender, or BMI between the patients and control groups (BMI). The median folic acid and UA levels were significantly different between the patient and control groups ($P= 0.001, 0.009$, respectively). It was shown that individuals with a favourable family history and those with scars had substantially higher median UA ($P= 0.001, 0.001$). There were significant connections between BMI and GAGS score ($P = 0.01, 0.007$). Serum UA and folic acid, according to the results of this investigation, may have a role in the inflammation of acne. The specific method by which serum UA and folic acid rise in acne sufferers is unknown at this time, and additional research is needed to corroborate this.

Key words: Uric Acid, Folic Acid, Acne Vulgaris.

1. Introduction

Chronic inflammation of the pilosebaceous unit is the hallmark of acne vulgaris. In this case, the comedones are both open and closed. Inflammation, aberrant sebum production, and abnormalities in the microbial flora are the most important pathogenetic components of acne [1].

As a B-vitamin, folate is a water-soluble nutrient (vitamin B9). It is not possible for humans to produce folates in the body, hence it must be received from food or dietary supplements [2]. C-reactive protein, vascular cell adhesion molecule-1, IL-1, and TNF- levels are all reduced by folic acid [3]. Pro-inflammatory cytokines and low-grade systemic inflammation have been linked to folic acid deficiency [4].

Crystalline result of protein metabolism that may be detected in the blood and urine is called UA (Tausche et al., 2006).

5 Oxidative stress is triggered and NO production is reduced when UA levels are elevated [6]. Norepinephrine (NO) has anti-inflammatory and antioxidant properties and may one day be used to treat acne [7]. Research has shown that UA contributes to oxidative stress. Nitric oxide oxidase activity is increased by hyperuricemia, and hence, oxygen species production is increased [8]. Acne vulgaris sufferers and healthy controls were compared in the present research, which measured uric acid and folic acid levels.

2. Subjects and Methods

The study included sixty acne patients and twenty age- and sex- matched healthy volunteers who were willing to participate in this study. Exclusion criteria were as follows: pregnancy, lactation, patient with severe acne, history of taking vitamins supplementation, isotretinoin, systemic antibiotic and immunosuppressive drugs, any systemic or other dermatological diseases

and active malignancy, topical or systemic therapy for acne less than three months prior to the study.

The participants were assigned in two groups: patient group included sixty patients suffering from mild or moderate acne vulgaris and control group included twenty healthy volunteers.

The acne severity was assessed according to global acne grading system (GAGS) [9]. Fasting venous blood samples (5 ml) were taken from patients and control groups to determine the level of serum folic acid by folic acid ELISA Kit. The UA was measured using colorimetric technique.

2.1. Statistical Analysis

The statistical analysis was done using the computer program Statistical Package for the Social Sciences (SPSS) version 25 (IBM, Armonk, New York, United States). Qualitative data were presented as number and percentages, while quantitative data with parametric distribution were presented as mean, standard deviations (SD), and ranges. Student's t test was used for numerical variables of normally distributed samples. The P values $<.05$ were considered statistically significant.

3. Results

The patients and control groups showed a non-significant difference as regards age, gender and BMI (Table 1).

The median folic acid level was significantly higher in patients than controls (median: 13.1, 8 respectively; $P < 0.001$). The median UA level was significantly higher in patients than controls (median: 4.4, 3.3 respectively; $P = 0.009$).

UA showed a significant positive correlation with BMI ($r = 0.329$ & $P = 0.01$) and GAGS score ($r = 0.343$ & $P = 0.007$).

Table (1) Comparison between patients and control groups as regards age, gender and BMI.
t =Independent t-test was used for age and BMI. X2= Chi-square test was used for gender.

		OR (95% CI)*		P	
Folic acid		4.281 (1.817 - 10.089)		0.001**	
UA		1.738 (1.107 - 2.731)		0.016**	
		Patients (n = 60)	Controls (n = 30)	Test	P
Age (Year)	Mean ±SD	22 ±4	23 ±4	t = 0.8	0.426
Gender	Males n (%)	31 (51.7)	12 (60.0)	X2= 0.419	0.517
	Females n (%)	29 (48.3)	8 (40.0)		
BMI	Mean ±SD	24.2 ±2.9	23.8 ±2.5	t = -0.541	0.59

Median UA was significantly higher in those with positive family history than those with negative family history (median = 5, 3.4 respectively; **P** = 0.001). Also, those with scar formation showed significantly higher levels of median UA than those with no scar formation (median = 6, 3.8 respectively; **P** <0.001). Furthermore, those who previously received isotretinone had significantly higher levels of UA than those who didn't receive it (median = 6.9, 4.3 respectively; **P** = 0.018).

4. Discussion

Continuous oxidative stress has been linked to chronic inflammation in studies conducted over the past two decades. Inflammatory elements are reportedly released as early as possible in the acne process, according to certain studies. Reuter and others [10]. Sebum oxidation increases the follicle's oxygen content, making it more conducive to the survival of P acnes [11].

Antioxidant and anti-inflammatory properties of folic acid have been observed, and this reduction in interleukin and C-reactive protein levels may be seen. Solini and others [12].

Extracellular UA has antioxidant capabilities since it can efficiently remove free radicals from human plasma. UA breakdown, on the other hand, generates intracellular free oxygen radicals, and combining with NADPH oxidase increases superoxide even more. Lin and others [13].

Folic acid levels in patients were substantially higher than in controls in this research (13.1 ng/ml vs. 8 ng/ml). According to Ghiasi et al. [14], the mean amount of folic acid in the patients group was 14.2 ng/ml, which is in line with our findings. Folate levels in the blood ranged from 12.79 ng/ml to 14.30 ng/ml, according to Yosef et al [15]. Another study found that the mean level of folic acid in the group of patients was 15.73 ng/ml.

On Javanbakht and colleagues [17]'s research of sixty-one Iranian acne patients, the mean folic acid concentration was (26.759.42 ng/ml), which was higher than the present study's results. As far as we can tell, this is in conflict with Gökalp et al. (18)'s research of 120 acne vulgaris patients and 100 healthy persons. Folic acid levels in the patients and control groups were not significantly different (median: 7.61 ng/ml, range: 2.98-17.22 and 3.95-19.79 respectively), according to the results of the study.

Serum UA levels were found to vary significantly (**P**= 0.009) between the acne patients and the control group in the present investigation.

This is in line with the findings of Metin and Turan [19], who found that UA values were (meanSD: 4.39 1.30 mg/dl). Contrary to the present research's findings, Solak et al. [20] looked at 51 adult patients with severe acne vulgaris and found that baseline UA levels were lower in their study (mean and SD: 3.892 1.114 mg/dl).

A link between BMI and serum UA levels was found in this study ($r=0.329$, **P**=0.01), which is in line with prior research. According to Honggang et al [21] in their investigation, higher BMI resulted in a linear rise in the serum level of urinary acid (UA).

In this research, 31.7 percent of acne patients had scars, and the serum UA levels were considerably greater in those with scars than those without scars. There was an even stronger association between the GAGS score and serum UA levels. This may be in line with the findings of Zhou et al. [22] who found that elevated blood UA levels were associated with elevated levels of malondialdehyde and superoxide dismutase, suggesting that these elevated levels were also associated with increased inflammation and oxidative stress.

Acne patients who had previously received isotretinoin were included in the present investigation. Prior to participating in this trial, patients were required to have been off isotretinoin for at least three months. These individuals had greater levels of UA than those who had not been given isotretinoin, which is of interest. Earlier research (Metin and Turan, [19] and Solak et al [20]).

5. Conclusion

We may infer from the fact that UA and folic acid levels in patients were considerably higher than in controls that these nutrients contribute to acne inflammation. The specific method by which serum UA and folic acid rise in acne sufferers is unknown at this time, and additional research is needed to corroborate this.

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