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ORIGINAL ARTICLE

Assessment of Serum IL-17 and Thyroid Autoantibodies (Anti-TPO and Anti-Tg) Levels in Vitiligo Patients Compared to Healthy Controls

Dakhil I. Saheb*, Thikra A. Mahmood
Department of Medical Microbiology, College of Medicine, University of Kufa, Najaf, Iraq

Key words:
Vitiligo, Interleukin-17, Anti-thyroid peroxidase, Anti-thyroglobulin, Autoimmunity

****Corresponding Author:***
Dakhil Ibraheem Saheb
Department of Medical Microbiology
College of Medicine,
University of Kufa
Najaf, Iraq
dakhlaljbwry797@gmail.com

ABSTRACT

Background: *Vitiligo is a chronic depigmenting disorder characterized by the selective loss of melanocytes. Immune dysregulation—particularly involving pro-inflammatory cytokines such as interleukin-17 (IL-17)—and thyroid autoimmunity have been implicated in its pathogenesis.* ***Objective:*** *To evaluate serum IL-17, anti-thyroid peroxidase (anti-TPO), and anti-thyroglobulin (anti-Tg) levels in vitiligo patients compared to healthy controls and to explore their associations with disease duration and clinical subtype.* ***Methodology:*** *In this case–control study, 60 patients with clinically diagnosed vitiligo and 60 age- and sex-matched healthy volunteers provided verbal consent and peripheral blood samples. Serum IL-17 concentrations were measured by ELISA (Bet Lab, China), while anti-TPO and anti-Tg were quantified using the Mallagu Sinb antibody analyzer. Group differences were assessed via independent t-tests, and scatter-plot analyses evaluated correlations with disease duration.* ***Results:*** *Serum IL-17 levels were significantly elevated in vitiligo patients (0.903 ± 0.032 ng/mL) compared to controls (0.733 ± 0.076 ng/mL; $p = 0.043$). No significant IL-17 differences were observed between generalized and localized vitiligo ($p = 0.288$), nor was there any correlation between IL-17 levels and disease duration. Anti-TPO and anti-Tg concentrations were markedly higher in the patient group ($p < 0.001$ and $p = 0.001$, respectively), but neither antibody level correlated with disease duration.* ***Conclusion:*** *The elevated IL-17 and thyroid autoantibody levels in vitiligo patients support roles for Th17-mediated inflammation and thyroid autoimmunity in vitiligo pathogenesis. The lack of association with disease duration or subtype underscores the need for longitudinal and mechanistic studies to clarify these relationships.*

INTRODUCTION

Vitiligo is an immune disease which influence roughly 5%of the global population. The treatment and prevention of autoimmune illeness remains hard, leading to significant discomfort for patient with large cost[1]. chronic complications result from the immune systems failure to recognize and tolerate self – antigen, result in creasesd inflammation and tissue damage[2].

Vitiligo is a persistent dermatology condition marked by the gradual depletion of function memanocye, leading to depigmented macules on the skin, hair, and mucous memberes[3]. The exact cause of vitiligo remains unclear[4]. This pigmentary illeness is often linked to many autoimmune complications includes autoimmune thyroides disease[5]. At the outset of the condition white patches of varing size emerge on various regions of the body[6].Vitiligo impacts approximately one percent of the global population across all skin types, typically manifesting before the age of 20[7].Vitiligo can be clincaly, categorized as localized or generalized, with the latter having acrofacial, vulgaris, universal, and mixed varient.localized vitiligo can influence one, two, or several segments and contains focal, segmental, and mucosal variants. Mixed and inderminante types of vitiligio also exist[8].

Inerlukin - 17 is a pro-inflammatory cytokine synthesis by Th17 cell. It role facilitates inflammation, attracts cytotoxic T cell, and induces melanocye death via oxidative stress and immune – mediated injury. Elevated lL-17 concentration correlates with active illeness. The potential involvement of lL-17 in the aetiology of vitiligo is overexpressed in numerous chronic autoimmune inflammatory disorders[9].

Numerous prior investigations have been conducted to Investigation the association of vitiligi with other autoimmune or endocrine disorders[10]. Vitiligo typically manifestests prior to the potential development of thyroid disease, it may be benificial to assess thyroid function and autoimmune antibodies in an individuals with vitiligo[11]. Anti-thyroid antibodies serve as markedly of the secondary immune response, indicating potential impairment of thyroid function. Furthermore,

the presence of thyroid globulin antibody and thyroid peroxidase is a crucial diagnostic criterion for autoimmune thyroid disease[12]. Consequently, the presence of TG-Ab and TPO-Ab serves as significant indicators of thyroid autoimmunity and by monitoring these antibodies can help determine the characteristics and severity of AITD[13]. Therefore, it is reasonable to test for thyroid antibodies in patients with vitiligo [14].

METHODOLOGY

Study Design and Setting

A hospital-based, case–control study was conducted at the Dermatology Unit of Al-Najaf Teaching Hospital (Najaf Province, Iraq) between December 2024 and March 2025.

Ethical Approval

The protocol was approved by the Research Ethics Committee of the College of Medicine, University of Kufa. All participants provided verbal informed consent prior to enrollment.

Participants

A total of 120 adults (age- and sex-matched) cases were enrolled and divided equally into two groups:

Vitiligo patients (n = 60): Clinically diagnosed by a board-certified dermatologist.

Healthy controls (n = 60): No personal or family history of vitiligo or other autoimmune disorders.

Exclusion Criteria

Individuals with any of the following were excluded:

- Concurrent autoimmune or central nervous system disorders
- Immunodeficiency states
- Active malignancy or chronic infection
- Recent surgery (< 3 months) or acute local infection/injury

Sample Collection and Handling

After overnight fasting, 5 mL of peripheral venous blood was collected from each subject into plain vacutainer tubes. Samples were allowed to clot at room temperature, centrifuged at 1,500 × g for 10 minutes, and the serum was aliquoted and stored at –80 °C until analysis.

Laboratory Assays

- Thyroid autoantibodies: Serum anti-thyroglobulin (anti-Tg) and anti-thyroid peroxidase (anti-TPO) were quantified by chemiluminescence immunoassay using the Maglumi™ analyzer (Snibe, Shenzhen, China).
- Interleukin-17 (IL-17): Serum IL-17 concentrations were determined via enzyme-linked immunosorbent assay (ELISA) kits (Bet Lab, China) according to the manufacturer's instructions. All assays were performed in duplicate.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 26.0. Continuous variables are presented as mean ± standard deviation (SD); categorical variables as counts and percentages. Independent t-tests compared means between groups, while chi-square tests compared proportions. Pearson's correlation assessed associations between biomarker levels and disease duration. A two-tailed p-value < 0.05 was considered statistically significant. All analyses were overseen by a qualified biostatistician to ensure validity and reliability.

RESULTS

The mean serum level of lL-17 was significantly elevated in vitiligo patients (0.90+0.03pgml) compared to the control group (0. 73+0.08 pg /ml) with difference being statistically significant (P =0.043) as shown in Table 1.

Table 1: IL-17 mean level in vitiligo patients and healthy controls

Type	N	IL-17 mean ±SD	p- value
Cases	60	0.90282 ± 0.032297	0.043
Control	60	0.73267 ± 0.076499	

The mean level of IL - 17 was slightly higher in patients with generalized type (0.93106+0.048097) compared to those with the localized type (o. 86045+0.035762). However, the difference was not statistically significant (P = 0.288/ NS) (Table 2).

Table 2: IL-17 mean level in localized type patients and generalized type patient

Type	n	IL-17 mean ±SD	P-value
Localized	24	0.86045 ± 0.035762	**0.288**
Generalized	36	0.93106 ± 0.048097	

ATG levels were markedly higher among vitiligio patients (23. 41+3.30lu /ml) In contrast to control (2.83+ 0.22 lu ml), with the difference being highly significant (P = 0.001) as shown in Table 3.

Table 3: ATG mean level in vitiligo patients and healthy controls

Type	n	ATG mean ± SD	p-value
Cases	60	23.40917±3.303585	**0.000**
Control	60	2.83300 ± 0.224129	

The mean level of ATPO was markedly higher in case (101.29925+ 25. 436100) compared to the control groups (10.32167+1.054509) and the difference was statistically significant (P value =0.001/S) as shown in Table 4.

Table 4. ATPO mean level in vitiligo patients and healthy controls

Type	n	ATPO mean ±	P-value 0.001
Cases	60	101.29925±25.436100	
Control	60	10.32167 ± 1.054509	

As shown in Figure 1, there is a positive linear correlation (r < 0.4) between IL-17 levels and the duration of vitiligo in years among patients.

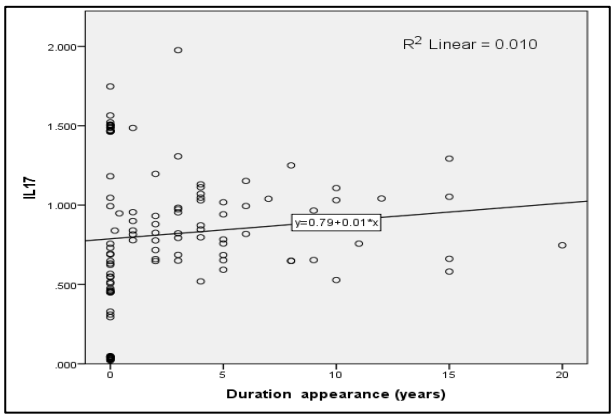

Fig. 1. Correlation between IL-17 levels (y = 0.79) and the duration of vitiligo onset (x = 0.01) in patients with vitiligo.

As shown in Figure 2, there is a positive linear correlation (r < 0.4) between ATG and the duration of vitiligo in years among patients

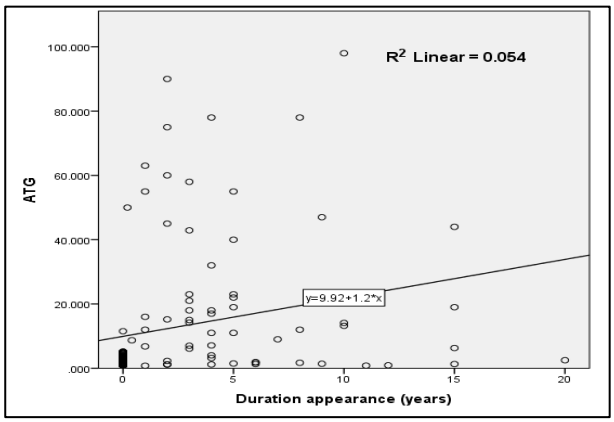

Fig. 2. Correlation between ATG levels (y = 9.92) and duration of vitiligo onset (x = 1.2) in patients with vitiligo

As shown in Figure 3, there is a weak positive linear correlation (r < 0.4) between TPO and the duration of vitiligo in years among patients

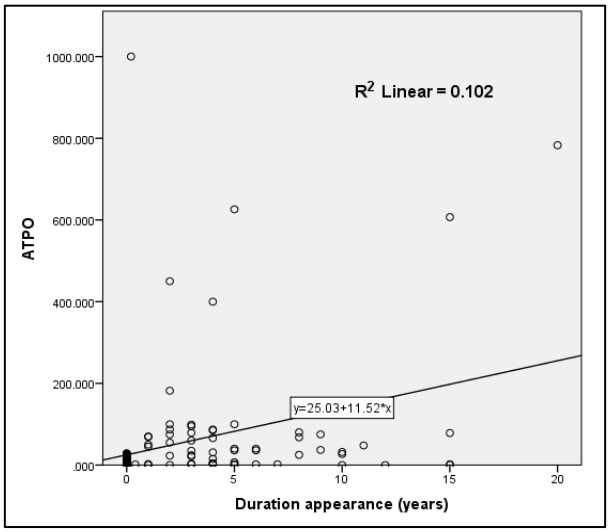

Fig. 3: Correlation between thyroid peroxidase antibodies (TPO) levels (y = 25.03 + 11.52x) and the duration of vitiligo onset (x = 10.2) in patients with vitiligo.

DISCUSSION

Our study showed that the lL- 17 level is significantly raised in vitiligo patients compared with healthy control, with (P value =0.043). This result agree with many studies done by **Sushama, *et al.* 15** and **Gholijani, *et al.* 16** , who reported significant higher lL-17 in an patient with different types of vitiligo. Our study indicates that lL-17 is higher in vitiligo patients compared to healthy control, which confirm its role in the disease pathogenesis.

By comparing serum levels of lL- 17 in patients with localized vitiligo and generalized vitiligo,

We found that the levels raised non significantly in the latter group (P value= 0.288). Disagreement with our study, some studies reported that lL- 17 was significantly higher in patients with generalized vitiligo and localized vitiligo[15,17].

The lack of a difference between localized and generalized vitiligo suggests similar Immune mechanism in both types. The discrepancy between some studies may be due to environmental and genetic factors.

In our study the scatter plot shows the relationship between lL-17 levels and the duration of vitiligo in patient. The statistically analysis results showed that the coefficient of determination (R2=0.010) is a very low value indicating that only 1% of the variances in IL-17 levels can be explained by the duration of the disease. The correlation coefficient (r=0.1) also reflects a very

weak, positive correlation, but it is not statistically significant, meaning that this relationship has no clear practical or clinical significance

Our study contrast with a report which found a significant high level of lL-17 **in generalized vitiligo**[15].

This indicate that the duration of vitiligo is not significantly related to the level of IL-17 in the blood, which may indicate that IL-17 does not have a cumulative or temporal role in disease progression, but rather may be linked to specific stages or diseas activity at specific time.

Our study results indicate elevated levels of thyroid antibodies, namely thyroglobulin (anti-Tg) and thyroid peroxidase (anti-TPO), in vitiligo patients compared to healthy controls, with the p-value for anti-Tg (0.00) and anti-TPO (0.001), reflecting a strong statistical relationship between Increased levels of these antibodies and the presence of vitiligo These results are in line with several previous studies that have supported the association between vitiligo and autoimmune thyroid disorders.

In clinical studies Investigating thyroid antibodies in vitiligo patients, an iranian study found that 36.7% of patients had anti-TPO antibodies, while 32.1% were positive for anti-Tg antibodies, suggesting a higher prevalence of autoimmune thyroid disorders in vitiligo patients[10]. Another study confirmed significantly higher levels of anti-TPO in vitiligo patients compared to healthy controls[18], which is also consistent with an indian study reported that 31.4% of vitiligo patients tested positive for anti-TPO antibodies[19]. These findings support the role of anti-TPO as a sensitive marker for the early detection of subclinical autoimmune thyroid diseases, reinforcing its value in identifying individuals at risk for thyroid disorders[20].

Additionally, one study suggested that vitiligo often precedes the onset of thyroid involvement, making early screening for thyroid antibodies essential for detecting at-risk cases[21]. Studies like ours ndicate an association between vitiligo and elevated levels of anti-Tg and anti-TPO antibodies, suggesting an abnormal Immune response that may affect the thyroid gland. This elevation may be an early indicator of thyroid disorders even before clinical symptoms , paving the way for early detection and prevention of. potential complications in vitiligo patients

According to the scatter plot the result indicates a very weak positive correlation between the duration of vitiligo and the level of thyroid peroxidase antibodies with an R2 value of 0.102. This means that only 10.2% of the variation in Anti-TPO levels can be explained by the duration of disease. Such a low value suggests that there is no statistically significant association between the two variables

The result according scatter plot the linear correlation analysis between the duration of vitiligo and the level of anti -thyroglobulin antibodies (anti Tg) revealed a weak positive correlation (r=0.232) that was not statistically significant, with an R2 value of 0.054. This indicates that the duration of the diseas does not significantly influence anti-tg levels, suggesting that other factors may play a more substantial role in derteming variations in this immunoligical marker among vitiligo patient.

The lack of statistically significance between the duration of vitiligo onset and levels of thyroid antibodies (anti-TPO and anti-Tg) may be due to the fact that antibody levels can be present early in the diseas or even before its clinical appearance. Therefore, the duration of vitiligo does not necessarily affect these antibody levels. Additionally, immune and genetic factors may influence the presence of these antibodies rather than the duration of the disease

CONCLUSION

The results suggest that IL-17 may plays a potential role in the development of vitiligo, while elevated levels of thyroid antibodies may reflect a possible relationship between vitiligo and thyroid disease. However, the study did not demonstrate statistically significant relationship between diseas duration and levels of interleukin - 17or thyroid antibodies. Nor was ther a significant association between interlukin - 17 and different types of vitiligo. There for, further studies are needed to investigate these relationshipe in greater depth and identify potential causative mechanism.

Declarations:

Consent for publication: Not applicable

Availability of data and material: Data are available upon request.

Competing interests: The author(s) declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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