

# CORRELATION BETWEEN TOTAL SERUM IGE LEVEL AND DISEASE ACTIVITY IN CHRONIC URTICARIA

Truong Quang Vu\*, Nguyen Van Thuong\*, Le Huyen My\*\*, Le Huu Doanh\*

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## ABSTRACT

**Introduction:** Urticaria is one of the most common allergic skin disease, which occurs either acutely or evolves in chronic courses. This study investigate the association between urticaria activity score (UAS7) and serum Ig E levels of the patient.

**Objective:** To measure the total serum IgE levels and to investigate the relationship between total IgE level and disease activity in chronic urticaria.

**Methods:** A cross - sectional descriptive study with 165 chronic urticaria patients from 7/2018 to 7/2019.

**Results:** The average value of IgE in the study was  $71.9 \pm 77.7$  (U/l). The proportion of increased total IgE group was 23.6%, in that maximum value was 461.7 U/l. The proportion of patients with daily frequency, Quinck edema, severity disease in the group with increased IgE concentration were 76.9%, 76.9% and 80.6%, respectively, higher than the group with normal IgE level.

**Conclusion:** The patient's IgE concentration and urticaria activity score did not have a linear correlation with each other.

**Key words:** total IgE, chronic urticaria.

## 1. INTRODUCTION

Chronic urticaria (CU) is manifested by irritation on the skin that occurs continuously for at least 6 weeks. Chronic urticaria is not usually life-threatening but it could disrupt work and daily life activities of patients and cause their low health-related quality of life. The pathogenesis

of the disease is involved in many factors such as: drugs, food, cosmetics, dust, mold, animal hair, etc In addition, it may be due to other causes not following the mechanism allergies such as physical factors, sunshine, pressure, injury. According to Torsten Zuberbier, several pathogenesis mechanisms of urticaria include: immunity, infection, pseudo-allergy, and chronic diseases [1]. Immune globulin E (IgE), an antibody found only in mammals, is one of the five human immune isotypes, IgG, IgA, IgM, IgD and IgE.

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*Scientific Reviewer: Prof. PhD. Tran Hau Khang*

*\* Hanoi Medical University*

*\*\* National Hospital of Dermatology and Venereology, Viet Nam.*



A quantitative IgE increasing indicates that a person is possible to be allergic to one or more allergens. The allergy-specific IgE concentration will increase after exposing allergens, then gradually decreasing over time, thus affecting the overall IgE level. We conducted the study to investigate total IgE levels in blood and the related factors of chronic urticaria patients.

**2. OBJECT AND METHOD**

**2.1. Object**

165 patients over 12 years old with chronic urticaria were submitted to the National Hospital of Dermatology and Venereology from July 2018 to July 2019.

**2.1.1. Criteria for selecting patients**

- Patients over 12 years old diagnosed with chronic urticaria
- Patients agreed to participate in the study.

**2.1.2. Exclusion criteria:** patients refused to participate in the study.

**2.2. Method**

**2.2.1. Designing the study:** Analytical cross-sectional study.

**2.2.2. Steps to conduct the study**

- Preparing the medical records for the study.
- Asking patients about their diseases status, collecting information.
- Examining and evaluating clinical symptoms and severity of the disease.
- Taking the patient’s serum and making total IgE ELISA test.
- Data processing.

**2.2.3. Some standards used in the study**

- Activity scoring of chronic urticaria: the urticaria activity score

**Table 1. Urticaria activity score (UAS)**

Score	Wheals	Itch
0	No	No
1	Mild (< 20 wheals/24 hr)	Mild (present but not annoying or troublesome)
2	Moderate (20-50 wheals/24 hr)	Moderate (troublesome but not interfere with normal daily activity or sleep)
3	Severe (> 50 wheals/24 hr or large confluent areas of wheals)	Severe (severe pruritus, which is sufficiently troublesome to interfere with normal daily activity of sleep)

- The normal serum total IgE serum levels in patients: < 100 U/l

**2.3. Data processing**

Data are entered and processed by SPSS 16.0 statistical software, using t-test algorithm and calculating the correlation coefficient.

### 3. RESULTS OF THE STUDY

#### 3.1. Characteristic of the objects

**Table 2. Distribution of chronic urticaria by gender and age**

Characteritis	n	%
Age		
≤19	27	16.4
20-39	88	53.3
40-59	45	27.3
≥60	5	3.0
<b>X ± SD</b> <b>(min-max)</b>	33.2 ± 12.9 (5-79)	
Gender		
Male	61	37.0
Female	104	63.0

The percentage of chronic urticaria in male (37.0%) is lower than that of female (63.0%). The

most common age group is from 20-39 (53.3%), followed by the group of 40-59 years old (27.3%).

#### 3.2. The total serum IgE levels in chronic urticaria

**Table 3. The total serum IgE levels of chronic urticaria**

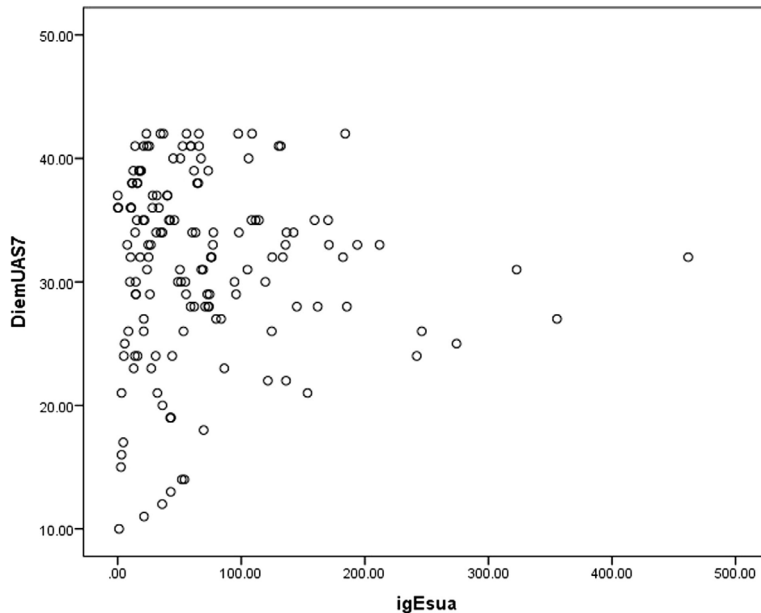
Total serum IgE	n	%
Normal (< 100 u/l)	126	76.4
Increased (≥ 100 u/l)	39	23.6
<b>Total</b>	165	100
<b>X ± SD</b> <b>(min-max)</b> <b>(U/l)</b>	71.9 ± 77.7 (0-461.7)	

The proportion of increased total IgE group was 23.6%, in that maximum value was 461.7 U/l.

**Table 4. The total serum IgE levels and symptoms of chronic urticaria**

Characteristic		Increased total serum IgE		Normal total serum IgE		p
		n	%	n	%	
Frequency	Daily	30	76.9	68	54.0	
	2-3 times a week	8	20.5	35	27.8	
	≤ 1 time a week	1	2.6	23	18.2	
Quinck	Yes	30	76.9	60	47.6	
	No	9	23.1	66	52.4	
Severity disease	Moderate	10	19.4	32	21.0	
	Severe	29	80.6	94	79.0	
<b>Total</b>		39	100	126	100	--

The proportion of patients with daily frequency, Quinck edema, severity disease in the group with increased IgE concentration were 76.9%, 76.9% and 80.6%, higher than the group with normal IgE level (with 54.0%, 52.4% and 79.0%, respectively).



**Figure 1. The correlation between serum total IgE levels and UAS7 of chronic urticaria**

The patient's IgE concentration and UAS score did not have a linear correlation with each other.

#### 4. DISCUSSION

During the study period, we selected 165 to satisfy the selection criteria. The age group of the patient was 20-39 accounting 53.3%. This result is consistent with the study of Tran Thi Huyen (2013) with the ratio of 61.3% [2]. This is explained that, in adulthood, the immune system is complete and the antigen exposure and the accumulation of sensitivity in life is sufficient to clinical manifestations. In the study, the ratio of men and women was 2:1. his result is similar to Tran Thi Huyen (2013), Broza (2011) [3], [4]. The authors believe that it is the concern about health and the possibility of stress-related vulnerability causing the higher incidence of female diseases than that of male.

Many authors around the world make assumptions about conditional autoantibodies and the model of MTD. According to this theory,

the nature of autoantibodies is mentioned in IgG group, resisting under the a group of affinity receptors for IgE. These antibodies bind only to the receptor when these receptors are not occupied by IgE. Therefore, the raising IgE levels in chronic urticaria is inevitable. The results of our study in Table 3.2 show that, only 39 in 165 cases of increasing IgE above 100 U/l (accounted for 23.6%). The average value of IgE in the study was  $71.9 \pm 77.7$  (U/l), the highest value was 461.7 U/l. This result is lower than Naveen N. et al (2019) [5]: the author's IgE concentration ( $759.19 \pm 73.79$  IU/l). We believe that the differences in racial and geographical characteristics may lead to differences in IgE concentration results. Our research results are also lower than that of Kessel A et al (2010), Zaky A et al (2010), Tang Ni et al (2017) và Yilmaz EA et al (2017) (tab 5) [6], [7], [8], [9].

**Table 5. Serum IgE level in other study**

	Population	Serum IgE level (IU/l)
Kessel A et al (2010)[6]	203	182 ± 16.12
Zaky A et al (2010) [7]	42	494.27
Tang Ni et al (2017) [8]	411	159.58 ± 4.43
Yilmaz EA et al (2017) [9]	222	63.5
Naveen N. et al (2019) [5]	103	759.19 ± 73.79
This research (2019)	165	71.9 ± 77.7

In chronic urticaria, persistent or relapsing nature can cause discomfort, troubles and affect the quality of life of patients. According to the literature, edema and pruritus usually last less than 24 hours, then go away quickly after taking antihistamines, corticosteroids, or they can go away on their own. However, in each patient, at different times, the frequency of new lesions is different. Table 3.6 shows that the proportion of patients with daily frequency of occurrence in the group with increased IgE concentration was 76.9%, higher than the group with normal IgE level of 54.0%, significant difference statistics with  $p < 0.05$ .

Quinck edema is localized in loosely organized areas such as limbs, eyelids, lips, joints, which suddenly occurs for several hours, repeatedly. If lesions appear in the respiratory mucosa, digestion can cause complications (respiratory failure, abdominal pain, vomiting, diarrhea ...), even cause anaphylactic shock. Our study showed that the percentage of patients with Quinck edema in the group with an increased IgE of 76.9% was higher than the group with normal IgE concentration of 47.6%. The difference was statistically significant with  $p < 0.05$  (Table 3.8). This result is similar to the study of Tran Thi Huyen (2013) with the rate of patients with angioedema

of eyelid, lip swelling was 42% [2]. Thus, IgE is a predictor of the patient's ability to appear in the Quinck match.

To assess the level of activity of urticaria, the authors often use the Urticaria activity score (UAS), which includes the level of itching and the number of edema diseases. In fact, the UAS7 score is the total score of the activity level of the disease used more frequently. Our study evaluated the association between IgE levels and UAS7 scores of patients. The results in Figure 3.2 show that patients' IgE and UAS7 scores do not have a linear correlation with each other. According to Yilmaz (2017), UAS7 scores are associated with persistent levels of chronic urticaria [9]. Naveen's study (2019) showed that 55.04% of patients had elevated IgE levels with moderate to severe disease activity [5]. However, we believe that there is no relation between UAS7 score and IgE concentration.

## 5. CONCLUSION

The proportion of increased total IgE group was 23.6%, in that maximum value was 461.7 U/l. The proportion of patients with daily frequency, Quincke edema, severity disease in the group with increased IgE concentration were 76.9%, 76.9% and 80.6% respectively, higher than



the group with normal IgE level. The patient's IgE concentration and UAS did not have a linear correlation with each other

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