

Serological evaluation of IgA and IgE antibodies in asthmatic patients in Diyala governorate: Implications for oncology patients

Olaa Moyad Ali¹, Manar Ibrahim Hasan², Amal Roshdi Ahmed³

¹Bilad Alrafidain University College, Department of Nursing techniques Diyala, Baqubah, Iraq

²Bilad Alrafidain University College, Department of Anesthesia techniques Diyala, Baqubah, Iraq

³Beni-Suef University, Faculty of Nursing, Egypt

ABSTRACT

The current study was designed for the serological evaluation of IgA, IgE antibodies using ELISA on a group of patients with asthma who attended the Consultation Clinic for Respiratory Diseases and Tuberculosis and the healthy in Diyala Governorate for the period from October 2020 to March 2021, where the findings of the present study revealed a significant increase in the incidence of asthma In the mean age (43.16 ± 2.14) years, when compared with the healthy group (38.35 ± 2.22) years. The results of the current study showed a significant increase in the percentage of females with asthma by (59.4%) compared to males at (40.6%). While the results of the current study showed a significant increase ($P < 0.008$) in the level of IgA in the blood in the group of patients with asthma (24.14) IU/ml and when compared with the healthy group (22.82 IU/ml). The results of the current study also showed a significant increase ($P < 0.004$) in the level of IgE in the blood in the group of patients with asthma (82.60) IU/ml and when compared with the healthy group IU/ml (77.98). Through these results, the current study concluded that immune factors, especially complement proteins and immunoglobulin, have a role in the mechanism of asthma disease, as they showed a close relationship in the occurrence and severity of the disease.

Keywords: IgA, IgE, asthma, cancer

INTRODUCTION

Asthma is considered one of the allergic diseases, and it is a chronic inflammation that affects the airways of the lungs in children and adults, and it occurs whenever Because of inflammation and tightness of the muscles around the tiny airways, the airways in the lungs constrict. Asthma symptoms include coughing, wheezing, shortness of breath, and chest tightness. These symptoms happen on occasion and worsen at night or during exercise. Other common "triggers" that may aggravate asthma symptoms are listed below. Triggers differ from person to person, but they can include viral infections (common colds), dust, smoke, fumes, changes in weather, grass and pollen, animal fur and feathers, soaps and strong scents, and the time of day when this inflammation happens, changes occur in the lungs as The airways are narrowed due to the contraction of the muscles in the bronchial wall and shrinking, and the secretion of mucus from the bronchial tubes increases, and the membranes lining them swell [1].

Asthma spreads in most countries of the world, especially in poor countries, according to the data of the World Health Organization for the year (2020), in which the number of deaths resulting from asthma reached (80%), at higher rates among young children than among adults, and among females than among males. The number of patients increased in 2015 to (358) million people, compared to (183) million people in 1990 AD, of whom about (397,100) died in 2015 [2, 3]. Asthma is the most common disease in the West, affecting more than 5 million people in England and Wales alone. The disease affects male children more than females, but it affects women slightly more than males among adults [4].

A network of mutually interacting cytokines that stimulate the inflammatory process regulates the airway inflammation that underlying asthma. Cytokines are proteins produced by immune cells that stimulate the inflammatory process. Th2 helper cells, which release two types of interleukins, play a crucial part in this process. They are (IL-4, IL-5), with IL-4 playing an important role in the early sensitization process to allergens as well as stimulating eosinophilia in the airways, and IL-5 participating in eosinophil activation and transmission to the airways. Cao and Athari describe bronchitis caused by blocked airways [5]. Many other interleukins related with the risk of acquiring asthma and produced by Th2 cells (including IL-2, IL-6, IL-1,

Address for correspondence:

Olaa Moyad Ali, Bilad Alrafidain University College, Department of Nursing techniques Diyala, Baqubah, Iraq.
E-mail: olaamoyad@gmail.com

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IL-13, and IL-9) are also connected with the risk of developing asthma. This multidirectional cytokine has mostly been researched in the context of T helper 2 (Th2)-related immunological illness disorders such as asthma and parasite infections. It plays the main role in excessive mucus secretion and also has a major role in causing asthma (Nicola ides and Reader that cytokines act as factors for cell activation, differentiation, and function. There are also many reports on cytokine gene polymorphisms and the production of interleukins that affect the balance of the immune response [6-8].

Asthma is a complex disease involving HLA class II molecules, and most of the asthma-prone genes discovered so far play a role in immune and inflammatory processes, which are also associated with allergic and hyperresponsive airway diseases, indicating a genetic link between asthma and other diseases. They play a role in asthma triggers and persistent airway inflammation. These cytokine-encoding genes are a type of asthma susceptibility gene, and their variation influences asthma severity. Targeted cytokine medicines are currently being used as new asthma treatments [9].

The current study aimed to evaluate serum IgA and IgE antibodies using ELISA technique on a group of patients with asthma and compare them with a group of healthy subjects.

MATERIALS AND METHODS

Study sample

Samples were collected in the consulting clinic for respiratory diseases in Diyala Governorate for the period from the beginning of October 2020 to the end of March 2021, where 74 blood samples were collected from patients with acute and chronic asthma after diagnosis by chest and respiratory doctors.

The number of females 45 and the number of males 29, with ages ranging from (16-87) years, and 26 blood samples were collected from apparently healthy people as a control group, and the number of females 5 and the number of males 21 with ages ranging from (25-45) years old.

Evaluate the level of immunoglobulin (IgE, IgA) using ELISA technique

The principle of the test: The ELISA plate contains the specific antibody (IgA or IgE). The standard solution and serum samples are added to the wells of the ELISA plate, as they combine with the specific antibodies. Wash Buffer) to remove the peroxidase enzyme that is not bound to the antibody reagent. The base material solution A and B is added to each well and the blue color will appear. Then the stop solution is added to each well and the color changes from blue to yellow. The Optical Density (OD) is measured at a wavelength of 450 nm.

Materials provided: The materials supplied in the ELISA kit for testing the level of immunoglobulin antibodies (IgE, IgA).

RESULTS

Measurement of the level of immunoglobulin (IgA)

The results of the current study showed that there was a slight increase in the level of immunoglobulin (IgA) in patients with asthma, which amounted to 24.14 compared to the control group, which amounted to 22.82. Asthmatic patients compared with the healthy group at a probability (p-value ≤ 0.008), as shown in (Table 1).

Tab. 1. The mean of IgA level for the study groups

IU/ml		Study Group	
		Control	Patients
IgA	Mean	22.82	24.14
	Minimum	20.34	21.47
	Maximum	171.06	317.55
P-Value		P <0.008	

Immunoglobulin E (IgE) level measurement

The current study found that there was an increase in the level of immunoglobulin (IgE) in asthma patients, reaching (82.60) when compared to the control group, which amounted to (77.98) when a

statistical comparison between the examined groups was made. The statistical analysis revealed a statistically significant difference in asthma patients compared to the healthy group at a probability value (P-0.004), as indicated in Table 2.

Tab. 2. The mean of the level of immunoglobulin IgE for the study groups

IU/ml		Study Group	
		Control	Patients
IgE	Mean	77.98	82.6
	Minimum	75.08	21.47
	Maximum	542.11	317.55
P-Value		P <0.004	

DISCUSSION

The conclusions of the investigation aligned with the findings of the researcher. Weber-Mzell conducted a study in Europe, and the researchers found that there was an increase in immunoglobulin (IgA) levels in the blood, and it was much higher in the winter, and its percentage was lower in females compared to males, and that serum levels increased with age in both sexes [10]. The current study's findings corresponded with the findings of the researcher's previous study in Iraq, in which he demonstrated that the level of IgA was much higher in the serum of asthma patients than in the serum of the healthy group [11, 12]. The study also revealed in Iraq, shows the amount of (IgA) in both (SRA) and (SSA) in asthma sufferers is higher than in healthy people [13, 14]. The current study's findings agreed with those of the Baghdad / Iraq-based researcher Al-Zaidi et al. [15]. It found that asthmatic patients had higher levels of immunoglobulin IgA than healthy people. According to the findings of this study, there is a link between Chlamydia pneumonia and asthma, depending on the type of immunoglobulin detection used. Extremely high. The current study's findings agreed with those of the researcher Ladjemi which was carried out in the United States, revealed a high level of immunoglobulin type (A) in asthma patients compared to healthy people, and demonstrated that asthma is connected with increased synthesis of immunoglobulin (IgE) in the lung [16]. However, the disease's impact on the secretory IgA system is uncertain. The current study's findings are also consistent with the findings of the researcher Hamada and Arif (2019) in Salah al-Din / Iraq, who found that the percentage (18.05%) of patients with asthma were positive for anti-rhinovirus (IgA) antibodies when compared to healthy people [17]. The link was statistically significant, and the current investigation contradicted the findings of Darwesh (2011), which was conducted in Iraq, as he indicated a decrease in the level of IgA in patients with asthma compared to healthy people [18].

The results of the current study agreed with the results of the researcher's study conducted in America, showing that the rate of IgE was higher in the serum of patients with asthma compared to the serum of the healthy group [19]. It was also found in a study conducted by the researcher AL-Saadi and Mahdi (2011) in Karbala Iraq, as it was found that there was a rise in the level of the immune antibody (IgE) in people with asthma in the age group (37-47) years and a decrease in its value occurred in the age group (48-58) years and the researcher showed that with increasing age, the value of IgE (IgE) decreased for asthmatic patients compared to healthy subjects [20].

The current study also agreed with the findings of Abood in Karbala/Iraq, which revealed an increase in IgE levels in illness patients compared to healthy people [21]. The study stated that there is an association between high IgE levels and age, but no relationship exists between high IgE levels and other risk factors for

asthma, such as male sex and family history. The current study's findings corresponded with those of the researcher Alaa and Thanaa who did research in Babylon / Iraq, indicating that there was an increase in the amount of immunological antibody (IgE) in patients with asthma compared to healthy people [22]. The current study's findings corresponded with those of researcher Brakhas, et al. in Baghdad / Iraq, who discovered a rise in total immunoglobulin (IgE) levels in asthma sufferers compared to healthy people, with significant variations between them. The current study's findings also concurred [23]. According to the findings of the researcher's study Al-Mamouri which was conducted in Babylon / Iraq, total IgE (IgE) levels were greater in the serum of asthma patients than in the serum of the healthy group [24]. According to the researcher, the level of IgE antibodies increased for everyone. The age groupings could be attributed to the allergy enhancing the effectiveness.

The results of the current study also agreed with the results of the researcher Rasheed in Baghdad / Iraq, as it showed the presence of high levels of total immunoglobulin (IgE) in patients with asthma compared to healthy people [25]. The results of the researcher also showed Abood and Mohanad, 2018 (In Iraq, the level of IgE antibody (IgE) in patients with asthma was higher compared to healthy people, with no significant differences between the severity of asthma and the demographic data (age, weight, and height). Also, in a study conducted by the researcher El-Gohary et al. (2018) in Egypt, there was an increase in the level of (IgE) in asthmatics who have the CT and TT genotypes compared with those who have the CC genotype. And there were no significant differences between the two groups with regard to age, sex distribution and exposure to passive smoking. The current study also agreed with the study of researchers Jebur and Saud (2020) conducted in Baghdad / Iraq, as they indicated a high concentration of immune antibody (IgE) in patients with allergic asthma compared to the control group, and the researcher indicated that this increase can be considered the main component in causing in allergic asthma. While in another study, the researcher, Reader in America, found that there was no significant increase in the level of IgE in patients with asthma, because the induction of B cells to produce IgE takes at least 7 days [26-29].

CONCLUSION

The study's findings revealed a modest rise in the level of immunoglobulin (IgA) in asthma patients, which amounted to (24.14) compared to the control group, which amounted to (22.82). The study's findings revealed that there was an increase in the level of immunoglobulin (IgE) in patients with asthma as compared to the control group, reaching (82.60) when a statistical comparison between the examined groups was made. Statistical significance in asthma sufferers versus the healthy group.

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