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SERUM LEVELS OF IL-13 AND IL-9 IN PATIENTS WITH ASTHMA

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Abstract:

Asthma was a heterogeneous illness. Symptoms often differ from person to person. The reasons of asthma is not identified, although people with asthma often have a family history of asthma, risk factors have been known and gene-environment interactions are essential. Symptoms often occur in early of the morning, at night and during/just after activity. T-cell play an important role in the pathogenesis of asthma by activation and alteration of cytokine levels, this study aims to evaluate the level of Interleukine-13 and Interleukine-9 in 50 asthmatic patients, and compared with 30 healthy control group. The results showed a significant increase in levels of interleukin-13 in asthma patients (P≤0.05) compared to control group. Also, significant increase in levels of interleukin-9 in asthma patients (P≤0.05) compared to control group.

Keywords: Patients, Asthma, IL-9, IL-13.

INTRODUCTION:

Asthma was a common lung disorder that causes sporadic breathing complications. It often occur in childhood, while it can also develop in adults, and affects people of all ages. There is presently no cure, but treatment can help relieve symptoms. Patients can live complete and rewarding lives with the right cure and management. Asthma was caused by the swelling and narrowing of the airway that carry air to and from the lungs (WHO, 2020), Common "types" of asthma include: allergic asthma, adult-onset asthma, steroid-resistant asthma, cough- variant asthma,exercise induced asthma, pediatric asthma, obesity-related asthma, eosinophilia (type 2 inflammation) asthma and aspirin-induced asthma. (Mims, 2015). Symptoms often differ from one to the other, but they are most commonly wheezing, tight feeling in the chest, continuing cough and breathlessness. Symptoms often arise at night, during/just after activity or early in the morning. (Zubair etal, 2018).Asthma severity was measured retrospectively from the level of treatment obligatory to control symptoms and exacerbations. Severe asthma was requires 5 steps treatment .It may appear similar to asthma that is uncontrolled due to lack of treatment. Moderate asthma was well controlled with step 3 treatment. Whereas, Mild asthma was controlled with step1or 2 treatment (Gina, 2019). When Allergens that enter the airway are capture by antigen presenting cells (APC) then display to the naïve CD4 T cell which differentiates into (Th2); Th2 cells themselves discharge a number of cytokines including IL-13, IL- 9 and IL-4 acting on diverse target cells such as basophils, mast cells, eosinophils, , smooth muscle cells, epithelial cells and B lymphocytes (NAEPP,1997) . IL-9 induces mast cell proliferation, differentiation, enhances goblet cell hyperplasia, mucus production, activation, and accumulation in the airways. IL-13 induces eosinophil influx in the airways, epithelial eotaxin expression, goblet cell hyperplasia with mucus hyper secretion and AHR. (Goto *etal*, 2010).

MATERIALS AND METHODS:

The study include 50 asthma patients (32 males and 18 females) collected from Al Karama teaching hospital , Al Zahraa teaching hospital as well as Al Numaniyah Hospital in the governorate of Wasit/Iraq and 30 individuals (20males and 10 females) with no symptoms of disease was control group. Ages were range from 15 to 51and 17to42 in each groups respectively. The blood samples were drawn from each patients and controls (4 ml) by vein puncture using syringes and collected in a plain tube and then centrifuged at 3000 r.p.m (Bishop et al, 1985) for 10 minutes, after that serum samples were carefully transferred and divided into (2) Eppendorf tubes and store in -70 ^{O}C until the day of analysis The concentrations of IL-9 and IL-13 were estimated by ELISA test according to the manual procedure of Shanghai Company (China). The results were analyzed using statistical system Spss version -22.0 (. Chi-squared test.).

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RESULTS:

The results in table (1) appeared IL-9 concentration (pg/ml) in the serum of patients was showed significant increase in asthma patients when compared with control group. The mean and standard deviation for patients (10.651± 2.745pg/ml), minimum is 4.770, maximum is 16.990 and range is12.220 .For control the mean and standard deviation (5.615 ± 1.536 pg/ml minimum is 3.430, maximum is 8.220 and range is 4.790

Table (1): the mean level of IL-9(pg/ml) in patients and control.

IL-9(pg/ml)	control	Patients	95% Confidencet Interval			Sig. (2-tailed)
			Lower Bound	Upper Bound		
Valid numbers	30	50	(4.621 - 6.858)		10.495	*P* < 0.001
Min	3.430	4.770				
Max	8.220	16.990				
Range	4.790	12.220				
Mean±Std. Deviation	5.615 ± 1.536	10.651± 2.745				

Significant at P≤0.05

In table (2) the results of IL-13 concentration (pg/ml) for the serum of patients showed significant increase in asthma patients when compared with control group. The mean and standard deviation for patients (20.023±2.684 pg/ml), minimum is15.190, and maximum is 26.510 and range is11.320.For control the mean and standard deviation (10.799 ±2.313 pg/ml), minimum is 7.340, maximum is 15.440 and range is 8.100.

Table 2: the mean level of IL-13 (pg/ml) in patients and control

IL-13(pg/ml)	control	Patients	95% Confidencet Interval			Sig. (2-tailed)
			Lower Bound	Upper Bound		
Valid numbers	30	50	(7.754 - 10.174)		15.156	*P* < 0.001
Min	7.340	15.190				
Max	15.440	26.510				
Range	8.100	11.320				
Mean± Std. Deviation	10.799 ± 2.313	20.023± 2.684				

Significant at P≤0.05

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DISCUSSION:

The results in our study showed significant increased in the mean concentration of IL-9 for the serum of asthma patients when comparison with control group. This results were agreement with the study by (Mahneh *etal*, 2016) in Iran who observed significant increase in the mean value of IL-19 concentration in asthma patients than in health group. Also, (Jia *etal*, 2017) in China, (Shimbara *etal*, 2000) in France**,** observed an increased in the concentration level of IL-9 compared to health individuals. The study illustrate the cytokine IL9 was produce by CD4 T cells by activation of transcription factors PU.1and IRF4. Th9 chiefly produce IL9, however, Th2 can also discharge this cytokine. IL9 is play important role in pathology of asthma by increasing of eotaxin release from lung epithelial cells and airway hyper responsiveness (Araujo, 2020).The interleukin-9 receptor appeared in the lungs of persons with asthma than in those of healthy persons. Interleukin-9 promotes inflammation, airway hyper responsiveness and remodeling, with a key feature being mast-cell activation and recruitment. Th9 cells subset of CD4 T cells, are supposed to be the main source of interleukin-9 in patients with asthma, and their numbers are amplified in patients with allergic disease**.** (Lloyd and Harker, 2018). In this study the results showed significant increased in the mean concentration of IL-13 in the serum of asthma patients when compared with control group. This results were agreed with the study by (Al-Quraishi, 2013) in Baghdad province who observed significant increase in the mean value of IL-13 concentration in asthma patients than in control. Also, (Alaa and Thanaa, 2013) in Babylon observed an increase in the concentration of IL-13 compared to health individual,(Lee *etal*,2001) in Korea observed the same results. Interleukin-13 (IL-13) was a pleiotropic cytokine created by (Th2) cells, basophils and mast cells, and is play important role in many features of asthma and induces various biological responses related to asthma, such as generation of eosinophil chemoattractants, maturation of mucus-secreting goblet cells, B-cell immunoglobulin E production, , production of extracellular matrix proteins and my fibroblast differentiation (Nair and O'Byrne,2019). Interleukin 13 is also known to play an important role in the regulation, homing, recruitment and activation of inflammatory responsive cells. IL-13 was well-known to induce the creation of IL-5 in the lung airway smooth muscles thus leading to regulating the recruitment of eosinophils into the airway spaces. (Ramireddy *etal*, 2018). Interleukin-13 is concerned as a central regulator in airway hyper responsiveness, mucus hypersecretion, and fibrosis and IgE synthesis. New research suggests that IL-13 pathway may be an essential target in the treatment of the different asthma phenotypes (Rael and Locky 2011).

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