Advances in Bioresearch
Adv. Biores., Vol 5 (2) June 2014: 01-04
©2014 Society of Education, India
Print ISSN 0976-4585; Online ISSN 2277-1573
Journal's URL:http://www.soeagra.com/abr.html
CODEN: ABRDC3
ICV 7.20 [Poland]

Advances in Bioresearch

ORIGINAL ARTICLE

The Association between Serum IL-1ß and IgE in Healthy Obese Men

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ABSTRACT
Accumulating experimental and epidemiologic data support that obesity is major risk factor for allergic disease. But the mechanisms underlying this relationship have not been fully established yet. To determine the relationship of serum IL-1ß to IgE, Twenty nine obese men (35 ± 5 yr, 177 ± 4 cm, 100 ± 13 kg) underwent a fasting blood samples in order to measuring serum IgE and IL-1ß. All participants were healthy, non-athletes and non-alcoholics. Pearson's correlation coefficients were used to evaluate the correlations between mentioned variables. A p-value < 0.05 was considered to be statistically significant. Based on statistical Analysis, there was a strong, positive, linear relation between IL-1ß and IgE in studied subjects. This finding support that obesity has an important role in allergic and respiratory diseases
Keywords: *Inflammation, Allergic diseases, Body weight*

Received 12/04/2014 Accepted 10/05/2014

How to cite this article:
Eizadi M, Khorshidi D, Samarikhalaj H, Dooaly H. The Association between Serum IL-1ß and IgE in Healthy Obese Men. Adv. Biores. 5[2] 2014; .DOI: 10.15515/abr.0976-4585.5.2.14

INTRODUCTION

Apart from genetic and heredity, physical inactivity on the one hand and following high-calorie diets, in particular high-fat foods in the other hand, are considered the major contributors to the incidence or prevalence of obesity and increased levels of body fat in both developed and developing countries. In addition, genetics and heredity also represents somewhat obesity and related diseases in adulthood from the beginning of life. Nevertheless, although obese people suffer from mobility problems and premature fatigue during exercise as well as psychosocial problems, many of the curable or irreversible metabolic abnormalities and chronic diseases are also considered as the consequences of increased fat or obesity. Scientific evidence has revealed that in addition to its importance as the source of fat storage in the form of triglycerides, adipose tissue affects other body tissues such as pancreas through releasing peptide mediators including leptin, adiponectin, ghrelin, resistin, and interleukins [1], disturbances in which are associated with many chronic and metabolic diseases such as diabetes and cardiovascular, renal, and respiratory diseases [2].

For example, it has been found that not only IL-1ß levels is of special importance in inflammatory and respiratory diseases, but also disturbance in its systemic levels affects metabolic disorders effective on obesity and body fat levels [3, 4]. Some studies on inflammation and obesity have pointed out a kind of direct correlation between levels of IL-1ß and BMI [5]. On the other hand, some researchers have linked obesity to allergic symptoms such as increased IgE levels [6, 7, 8]. Certain previous studies have also suggested a relationship between obesity and respiratory diseases such as asthma [9]. IgE is a key factor in pathogenesis of asthma and inflammatory reactions of airways in which the antibody can inhibit the incidence and increment of inflammation [10].

Considering increased levels of IL-1ß in obesity and high levels of IgE in asthmatic patients on the one hand, and the relationship between obesity and respiratory diseases such as asthma on the other hand, one can ask whether levels of inflammatory cytokines such as IL-1ß is related to IgE levels in obese people. Therefore, the present study aimed to determine the association between IL-1ß and IgE in adult obese men.

RESEARCH DESIGN AND METHODS

Study Subjects and Recruitment: Twenty nine adult obese men (36.± 4 years mean ± standard deviation) participated in the study by accessible sampling. All subjects were otherwise in good health were taking no

medications. The study protocol was approved by Ethics Committee of Islamic Azad University, Iran and informed consent was obtained from all subjects before recruitment into the project. Weight was measured to the nearest 100 g using digital scales. Standing height was measured to the nearest 0.1 cm with the use of a wall-mounted stadiometer. Abdominal obesity was determined as waist circumference measured in a standing position. Hip circumference was measured at the maximum circumference between the iliac crest and the crotch while the participant was standing and was recorded to the nearest 0.1 cm. BMI was calculated as weight in kilograms divided by the square of height in meters (kg/m2).

Inclusion and exclusion criteria: All subjects had a body mass index (BMI) greater than 30 kg/m^2. Subjects were asked to complete questionnaires on anthropometric characteristics, general health, smoking, alcohol consumption, and present medications. Participants were non-athletes and non-alcoholics. Participants were included if they had not been involved in regular physical activity in the previous 6 months. We also excluded people who had any self-reported physician diagnosed chronic disease (arthritis, stroke, diabetes, hypertension, cancer, heart attack, chronic cough, or bronchitis)

Laboratory measurements: Fasting blood samples were collected from brachial vein in sitting position at the hormone laboratory after an overnight fast. Blood samples were dispensed into EDTA-coated tubes and centrifuged for 10 minutes in order to separate serum. Blood was analyzed for IL-1ß and IgE. Serum IL-1ß was determined by ELISA method (Enzyme-linked Immunosorbent Assay for quantitative detection of human IL-1β). The Intra- assay coefficient of variation and sensitivity of the method were 5.1% and 0.3 pg/mL, respectively for IL-1ß. The Intra- assay coefficient of variation and sensitivity of the method were 5.87% and 1.0 IU/mL, respectively for IgE (Monobind Inc, CA 92630, USA).

Data management and statistical analysis: Means and standard deviations were calculated for all variables. After calculation of the mean and the standard deviation, the statistical analysis was conducted using the SPSS software version 15.0. Pearson's correlation coefficients were used to evaluate the correlations between IgE and IL-1ß. Statistical significance was accepted at p-value<0.05 or lower.

RESULTS

As above mentioned, this study performed to determine relationship between serums IgE with IL-1ß in adult obese men. Table 1 show the descriptive anthropometric and biochemical features of studied participants. Data of Pearson's correlation coefficients showed a significant positive correlation between them in studied subjects (p = 0.000, r = 0.74, Fig 1).

Table 1: Mean and standard deviation of anthropometrical and biochemical markers of studied subjects.

	Mean	Std. Deviation
Age (year)	35.55	4.163
Height (cm)	176.90	4.271
Weight (kg)	99.95	13.457
Systolic blood pressure (cmHg)	12.62	1.049
Diastolic blood pressure (cmHg)	8.55	.827
Abdominal (cm)	106.45	9.136
Hip (cm)	106.14	8.467
WHO	1.0028	.03058
Bosy mass index (kg/m2)	31.869	3.3457
Body Fat (%)	31.055	3.9672
IgE(IU/ml)	170.86	145.344
Interleukin-1B (pg/ml)	2.910	1.9514

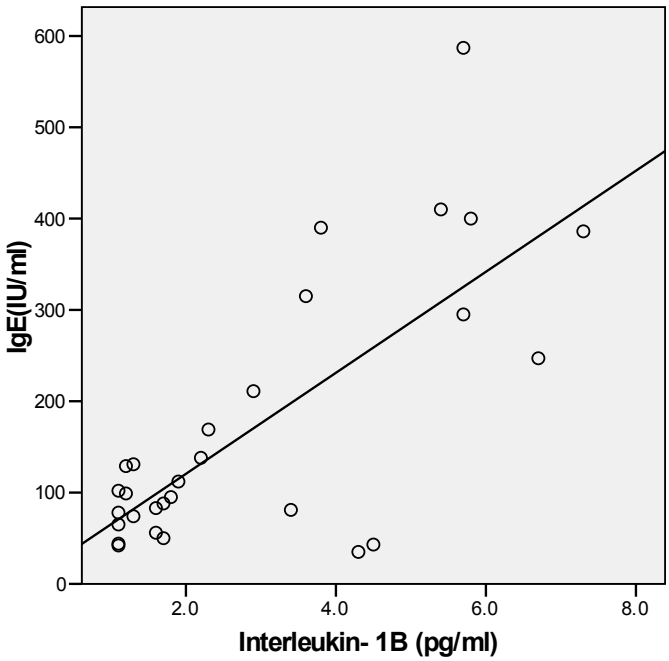

Fig 1; Relation between serum IL-1ß and IgE in studied subjects. A significant positive correlation was found between them

DISCUSSION

Potential importance of peptide mediators such as adipokines in obesity and its related diseases including cardiovascular and respiratory diseases and diabetes is unavoidable and several studies have been conducted in this regard. However, the precise molecular mechanisms responsible for the effect of these cytokines in incidence of the mentioned diseases are not fully understood. Furthermore, the precise molecular mechanisms involved in the pathology of obesity and its related diseases are not well known as well. For example, increased levels of IL-1ß in both obese people and respiratory patients have been reported frequently, however, the molecular relationship between this cytokine and some allergic factors such as IgE which is crucial in respiratory diseases such as asthma or chronic obstructive disease are not still studied. No study was performed so far to investigate the relationship between these two in obese people. This study compared for the first time the pattern of relationship between IL-1ß and IgE levels in obese individuals. However, to support of some previous findings have noted this point that increased secretion of IL-1ß leads to lung inflammation, destruction of pulmonary alveolar elastic fibers, fibrosis or obstruction of respiratory airways wall, and accumulation of lymphocytes in airways in respiratory patients [3]. The findings of the present study showed a strong positive association between IL-1ß as an inflammatory cytokine and IgE as one of the indicators of respiratory or allergic diseases.

The role of pro-inflammatory cytokine IL-1ß in the relationship between inflammation and obesity has been suggested several times, although the pathophysiological mechanisms of this association are not fully understood [11]. This inflammatory cytokine is associated with not only inflammatory diseases and asthma, but also with metabolic abnormalities effective on obesity and regulation of body fat [3, 4]. Similar to other immunoglobulins, IgE is produced in mast cells and plasma cells [12]. Increased plasma levels of this predictor of allergic and respiratory diseases have been observed by some previous studies in obese or overweight individuals when compared with normal weight people [3].

In this regard, the findings of a study showed higher levels of IgE in obese or overweight children and adults in comparison with normal weight children [13]. The researchers also pointed out the fact that increased IgE in obese people is associated with allergic and respiratory diseases [13]. Another study on a large group of children has reported higher IgE levels in obese or overweight children compared to those with normal weight [14]. In contrast, no significant difference in the levels of IgE was observed between obese and normal weight individuals in the study by Leung et al [15]. In conclusion, based on the result of this study, our data demonstrate a strong relationship between systemic inflammation and allergic symptoms in obese men. On the other hand some previous studies have noted that a weight reduction can be improved inflammation profile [16, 17] and allergic markers such as circulating IgE [18].

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