Study of high sensitivity C reactive protein in bronchial asthma in children
Thesis

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In pediatrics

By

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Introduction

Asthma is disorder defined by its clinical, physiological and pathological characteristics. The predominant feature of the clinical history is episodic shortness of breath, particularly at night, often accompanied by cough (GINA, 2011).

Allergic disorders are one of the most common diseases of man. It is about 25-30% of the total population of the globe is suffering from allergic diseases including bronchial asthma, allergic rhinitis, allergic conjunctivitis, atopic dermatitis, food allergy and drug allergy (WHO, 2009).

Asthma is a very common chronic disease in respiratory system in which the constricted airways become inflamed and are lined with excessive amount of mucus (Harold and Nelson, 2008).

Asthma is caused by a complex interaction of environmental and genetic factors (Martinez, 2007).

Worldwide, 130 million people have asthma. The prevalence is 8-10 times higher in developed countries (e.g., United States, Great Britain, Australia, New Zealand) than in developing countries. In developed countries, the prevalence is higher in low income groups, in urban areas and inner cities than other groups. (Girish and Michael, 2012).

It is well known that C reactive protein (CRP) increases during infection and autoimmune disorder (Szalai, 2004).

There have been some reports concerning the measurement of serum level of high sensitivity C reactive protein (hs-CRP) as a useful tool for detecting systemic inflammation in asthma (Fujito et al., 2007). hs-CRP enable identification of CRP at low levels that were previously undetectable using routine assays and can reflect even low grade inflammation in several disorders such as cardiovascular disease and diabetes mellitus (Rifai et al., 1999).
Furthermore, population-based study showed association of increase levels of serum hs-CRP with a high frequency of airway hyperresponsiveness and low forced expiratory volume in 1 sec (FEV1%), suggesting that systemic inflammation may be associated with respiratory impairment (Kony et al., 2004).

Another epidemiological study showed that elevated levels of hs-CRP correlate significantly with symptoms and prevalence of non-allergic asthma (Olafsdottir et al., 2005).

Asthma, allergic rhinitis and atopic dermatitis are almost invariably accompanied by elevated levels of IgE, genetic analysis of families have shown that bronchial hyper-responsiveness and IgE levels are linked (Postma et al., 2002).
Aim of the work

The aim of these study is to measure serum level of high sensitivity C reactive protein in asthmatic children correlating it with severity of the disease and the forced expiratory volum in 1 second (FEV1%).
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Subjects and Methods

Subjects:

This case-control study will be carried out at Allergy&Asthma clinic, pediatric department, Benha University, during the period from May 2012 to December 2012, it will include two groups:

1-patients group: 30 asthmatic children that will be chosen randomly from Allergy&Asthma clinic, pediatric department, Benha University.

2-Controls group: 20 healthy children with the same age and sex that will be chosen randomly from primary and Preparatory schools from benha city.

Inclusion criteria:
1-Age 6-15 years diagnosed as bronchial asthma.
2-Cooperative children.

Exclusion criteria:
1-Children with chronic systemic diseases other than asthma.
2-Non cooperative children.

A written informed consent will be obtained from both parents of patients and controls. The pediatric department board ethically approved the study.

Methods:

Asthmatic children will be collected according to "GINA Guidline" as the following

1- History: a good patient history for symptoms of airway obstruction eg (wheezing, cough, cough at night or exercise, shortness of breath, chest tightness, sputum production. (Coffman, 2009), family histroy of allergy, sinuinitis, rhinitis, eczema, in close relatives.

2- Physical examination: respiratory rate, heart rate, accessory respiratory muscles movement, and chest auscultation.

3- Investigation: chest-x-ray and spirometry and others.
After examination both groups will undergo:

1-Spirometry:
Short acting bronchodilator will be stopped at least 8 hours before the test, Spirometry(Jaeger) will be performed for measurement of (FEV1%), the highest values of the three forced expiratory maneuvers will be used, according to "GINA,2011".

2-venous blood samples will be collected for measurement of:

* High sensitivity C reactive protein:
The hs-CRP ELISA is based on the principle of a solid phase enzyme-linked immunosorbent assay (Votila et al.,1981). The assay system utilizes a unique monoclonal anti-CRP antibody is used for solid phase immobilization (on the microtiter wells).A goat anti-CRP antibody is in the antibody-enzyme (horseradish peroxidase) conjugate solution. The test sample is allowed to react simultaneously with the two antibodies, resulting in the CRP molecules being sandwiched between the solid phase and enzyme-linked antibodies. After a 45-minute incubation at room temperature, the wells are washed with water to remove unbound labeled antibodies. A tetramethylbenzidine(TMB) reagent is added and incubated for 20 minutes, resulting in the development of blue color. The color development is stopped with the addition of 1N HCl changing the color to yellow. The concentration of CRP is directly proportional the color intensity of the test sample. Absorbance is measured spectrophotometrically at 450 nm.(DRG CRP, HS C-Reactive Protein) (EIA-3954).

*Total IgE:
The test corresponds to an enzyme immunoassay(EIA) for the determination of antibodies. Anti-human IgE antibodies of non humen origin are bonded to the inner surfaces of the wells of a microwell plate. Humen IgE antibodies present in the standards, control and patient samples are bound by these antibodies. In the second step, an antihumen IgE antibody conjugate with alkaline phosphatase is add which attaches itself to the bound humen IgE antibody.
In the third step, a substrate is added which is dephosphorylated by the alkaline phosphatase. The resulting colour change from colourless to yellow is measured using a photometer at 405 nm and a reference wavelength of 620 nm. The intensity of the yellow colour is proportional to the quantity of IgE antibodies in the serum. The results are expressed in IU/ml. (RIDASCREEN Total IgE 03-10-14).
Statistical design

The collected data will be tabulated and analyzed by the appropriate statistical methods using the Computer (SPSS program).
References


