Determination of MDA as oxidative stress marker and most common type of blood group in asthmatic patients before and after treatment with montelukast drug.

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Abstract

Asthma is a complex chronic inflammatory disorder of airways characterized by airway smooth muscle hypertrophy, hyperplasia and over production of mucous in which many cells and cellular elements play an important role.

The aim of the study is to monitor the changes in asthmatic patients before and after treatment with montelukast in the MDA level as oxidative stress marker in asthmatic cases, and the most common type of blood group. The total number of subjects included in this study was two hundred with acute asthma. The major part of this study represents a follow up study.

Subjects with bronchial asthma were previously diagnosed but not on regular treatment, their aged ranged between (16 – 50) years attending the respiratory unit directly at tikrit teaching hospital. The period of data collection was from first of April of 2013 up to the mid of June- 2014.

There is a significant change in level of MDA, during the asthmatic attacks (1.12± 0.42, while after treatment (0.6 ± 0.34 $P \leq 0.001$). The most common type of blood group in asthmatic cases is type O which about 69% from total number of cases , type A about 18.5%, type B about 9% , and type AB about 3.5%).

Introduction

Asthma is a common chronic inflammatory disease of the respiratory airways characterized by variable and recurring symptoms, reversible airflow obstruction and bronchospasm; common symptoms include wheezing, coughing, chest tightness and shortness of breath. (1, 2).Asthma is thought to be caused by a combination of genetic and environmental factors; its diagnosis is usually based on pattern of symptoms, response to therapy, over time and spirometry. (3).

It is clinically classified according to the frequency of symptoms, forced expiratory volume in one second and peak expiratory flow rate.(3).Asthma may also be classified as atopic (extrinsic) or non-atopic (intrinsic), based on whether symptoms are precipitated by allergens (atopic) or (non atopic). (4).

While asthma is classified based on severity, at the moment there is no clear method for classifying different subgroups of asthma beyond this system .(5).Finding ways to identify subgroups that respond well to different types of treatments is a current critical goal of asthma research .(5).Although asthma is chronic obstructive, it is not considered as a part of chronic obstructive pulmonary disease as this term refers specifically to combinations of disease that are irreversible such as bronchiectasis, chronic bronchitis, and emphysema. (6).Unlike these diseases, the airway obstruction in asthma are usually reversible; however, if left untreated, the chronic inflammation from asthma can lead the lungs to become irreversibly obstructed due to airway remodeling. (7). In contrast to emphysema, asthma affects the bronchi, not the alveoli (8).Asthma exacerbation an acute asthma is commonly referred to as an asthma attack, the classic symptoms are shortness of breath, wheezing and chest tightness, while these are the primary symptoms of asthma. (9, 10).

Some people present primarily with coughing, and in severe cases, air motion may be significantly impaired such that no wheezing is heard. Signs which occur during an asthma attack include the use of accessory muscles of respiration (sternocleidomastoid and scalene muscles of the neck), there may be a paradoxical pulse (a pulse that is weaker during inhalation and stronger during inhalation), and over-inflation of the chest. (11, 12). A blue color of the skin and nails may occur from lack of oxygen. (13). There is a long list of possible risk factors but research is frequently contradictory or confounded :(14, 15, 16, and 17).

1-Personal history of atopy
2- Family history of asthma or atopy.
3- Inner city environment
4- Socio-economic deprivation
5- Obesity.
6- Prematurity and low birth weight
7- Viral infections in early childhood
8- Maternal smoking
9- Smoking.
10- Early exposure to broad-spectrum antibiotics (18).

Asthma is an airway disease that can be classified physiologically as a variable and partially reversible obstruction to air flow, and pathologically with overdeveloped mucous glands, airway thickening due to scarring and inflammation, and bronchoconstriction, the narrowing of the airways in the lungs due to tightening of surrounding smooth muscle. Bronchial inflammation also causes narrowing due to edema and swelling caused by an immune response to allergens.

Also asthma is a common syndrome that presents as physiologic dysfunction of the lung characterized by airflow limitation and airway hyper responsiveness (19). The pathphysiology of asthma has been attributed to inflammatory processes that occur predominantly in the large airways. (20).

While there is no cure for asthma, symptoms can typically be improved. A specific, customized plan for proactively monitoring and managing symptoms should be created (21) .This plan should include the reduction of exposure to allergens, testing to assess the severity of symptoms, and the usage of medications .The treatment plan should be written down and advise adjustment to treatment according to changes to changes in symptoms.(22)

The most effective treatment for asthma is identifying triggers, such as cigarette smoke, pets, or aspirin, and eliminating exposure to them, if trigger avoidance is insufficient, the use of medication is recommended, pharmaceutical drugs are selected based on, among other things, the severity of illness and the frequency of symptoms, specific medication for asthma are broadly classified into fast-acting and long acting categories. (23, 24).

Bronchodilators are recommended for short term relieve of symptoms, in those with occasional attacks, no other medication is needed, if mild persistent disease is present (more than two attacks a week, low- dose inhaled corticosteroids or alternatively, an oral leukotrines antagonist or mast cell stabilizer is recommended, for those who have daily attacks, higher dose of inhaled corticosteroids is used, in a moderate or severe exacerbation , oral corticosteroids are added to these treatments.(25).

Aim of the study:

The objectives of this study were to:

1- Determine the most common type of blood group in asthmatic cases.

2- Determine the MDA as oxidative stress marker in asthmatic patients before and after treatment with montelukast.

Patients and methods:

The total number of subjects included in this study was two hundred with acute asthma. The major part of this study represents a follow up study. Subjects with bronchial asthma were previously diagnosed but not on regular treatment, their aged ranged between (16 – 50) years attending the respiratory unit directly at tikrit teaching hospital. The period of data collection was from first of April of 2013 up to the mid of June- 2014.This study include identify the most common blood group in asthmatic patient and measurement of MDA as oxidative factors before and after treatment with montelukast tab (10 mg) as a single dose daily at night for six weeks duration.

Result:

In the present study, the percentage of blood group in asthmatic cases is 69% of them with blood group O, 18.5% with blood group A, 9% with B, and 3.5% with AB as shown in table (1). This means that the more common blood group in asthmatic cases is blood group O.

In the present study, Malondialdehyde (MDA) as oxidative factor was significantly decrease after treatment in asthmatic patients (0.6±0.34) as compare with the mean MDA before treatment(0.99±0.52),(P value 0.001), (P value 0.001) as shown in table (2).

Table (1) Shows the blood group in asthmatic patients

Blood group	Number
O	138
A	37
B	18
AB	7
Total	200

Table (2) Show the MDA concentration in asthmatic patients before and after treatment

Parameter	Groups	Mean	SD	P-value
MDA	Before	0.99	0.52	0.001
	After	0.6	0.35	

Discussion:

Results of present study shows the most common type of blood group in asthmatic cases is type O which about 69% from total number of cases , type A about 18.5%, type B about 9% , and type AB about 3.5%). This result agree with study of Kauffmann F et al. , who found that blood group O subjects had lower lung function values and higher prevalence of asthma and wheezing(26).

Other studies showed there a significant increase in percentage of bronchial asthma in blood group (O) may be due to genetic reason that the (FUTI) gene which is previously named H-gene normally controls the genetic group which can be replaced by Glycosyltransferase which are involved in exocrine secretion system of the respiratory system (27,28,29). Moreover the production of secretor genes (FuT2) and blood group genes affect the tissue of respiratory system resulting in development of bronchial asthma (30,31) also it was reported that H-lectins can react with RBC of blood group (O) which can initiate the development of bronchial asthma (32, 33).

Other study done by Al-Shamma y. who found that there are a significant increase in percentage of blood group (O) in comparison with other Asthma is a complex chronic inflammatory disorder of airways characterized by airway smooth muscle hypertrophy, hyperplasia and over production of mucous in which many cells and cellular elements play an important role (34).

In the present study, there is a significant change in level of MDA, during the asthmatic attacks (1.12± 0.42, while after treatment (0.6 ± 0.34 $P \leq 0.001$).

These results will be agree with study of Rahman et al. who reported that the plasma MDA level was higher in asthmatic patients than controls as well as with in patients with asthma exacerbation as compared to stable asthma. Similarly, another study

entails that MDA level in BAL fluid was higher in mild to moderate asthmatic patients (35).

Al-Abdulla et al also reported that the mean serum level of MDA was significantly raised with increasing severity of asthmatic attack among patients grouped according to degree of severity (35). Kanazawa et al. have also found differences related to severity in patients with acute exacerbations. (30).

The present results agree with the study of Wood (31) who observed that MDA level is elevated in both plasma and breathe condensate of asthmatic patients. Also these results agree with study of Comhair SAA et al that showed a higher level of oxidative stress and this reflected clinically by development of severe asthma and worsening of airflow limitation (32).

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تحديد المالونديالديهايد كعامل اجهادي مؤكسد، وفصيلة الدم الاكثر شيوعا في المرضى المصابين بالربو القصبي الحاد قبل وبعد العلاج بعقار المونتيلوكاست

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الملخص

يعد الربو القصبي من الامراض المزمنة والمعقدة التي تصيب المسالك التنفسية والذي يتميز بتقلص عضلات الجهاز التنفسي وزيادة في افراز المواد المخاطية في الاشخاص الذين يحملون او يتميزون بسرعة التحسس للتأثيرات الخارجية والتي تؤدي الى نوبات متكررة تشمل صعوبة في التنفس شد عضلي في الصدر وسعال وخاصة خلال فترة الليل او في بداية الصباح الباكر. ويترافق عادة مع هذه النوبات ضيق في الممرات الهوائية والتي تكون انعكاسية اما تلقائيا او بواسطة العلاج.

الهدف من هذه الدراسة هو قياس التغييرات التي تحدث لمرضى الربو (المشخصين سابقا بإصابتهم بالمرض ولكنهم لا يتعاطون العلاج بصورة منتظمة) للأعمار بين 16–50 سنة في شعبة العناية التنفسية في مستشفى تكريت التعليمي في محافظة صلاح الدين والدراسة بدأت في بداية شهر نيسان للعام 2013 الى نهاية شهر حزيران 2014 في مرضى الربو قبل وبعد العلاج وذلك باستخدام مونتيلوكاست حب (10 ملغم) حبة واحدة يوميا لمدة ستة اسابيع في نسبة المالونديالديهايد, وايضا معرفة فصيلة الدم الاكثر. في هذه الدراسة بالنسبة لقياس المالونديالديهايد فان هنالك فروقات معنوية قبل وبعد العلاج حيث يكون مستواه عالي قبل العلاج اما بعد العلاج فيكون اقل.فيما يخص نوعية فصيلة الدم التي تكون اكثر شيوعا في مرضى الربو فان نسبة فصيلة الدم O تشكل 69% من مرضى الربو, تليها فصيلة A وتشكل نسبة 18.5 وفصيلة B وتشكل 9% وأخيرا AB وتشكل 3.5% من مجموع المرضى شيوعا لدى مرضى الربو.