Study of Adenosine Deaminase Activity In COPD Patients

Thesis

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List of Abbreviations

Abb.	Full term
AECOPD	*Acute exacerbation of COPD*
CAP	*Community acquired pneumonia*
CLL	*Chronic lymphocytic leukemia*
COPD	*Chronic obstructive pulmonary disease*
CRP	*C-reactive protein*
CRT	*Chemoradiotherapy*
DLCO	*Diffusion capacity*
Hs-CRP	*High sensitivity CRP*
IBD	*Inflammatory bowel disease*
ICU	*Intensive care unit*
IL-6	*Interleukin -6*
LAMAs	*Long acting muscarinic receptor antagonists*
LDC	*Leukocyte differential count*
NHANES	*Third National Health And Nutrition Examination Survey*
NLR	*Neutropil – Lympocyte Ratio*
OSA	*Obstructive sleep apnea*
PCV	*Packed cell volume*
PLR	*Platelet / lymphocyte ratio*
Pro-CT	*Pro-calcitonin*
TNF	*Tumor necrosis factor*
WHO	*World health organization*

Abstract

The natural history of chronic obstructive pulmonary disease is characterized by frequent exacerbations. Majority of the exacerbations are infectious and bacteria responsible for 30-50% of these cases. The purpose of this study was to assess the effect of COPD and smoking on the serum ADA level, it was found that serum ADA level decreased in COPD patients and healthy smoking group.

This study was carried out on 100 subjects (patients and controls). The Patients carried out from The Abbasyia Chest Hospital. subjects divided into 50 cases (control group) which contained 25 healthy smoker group and 25 healthy nonsmoker group, and 50 cases diagnosed as having COPD according the criteria of the global initiative for chronic obstructive lung disease (GOLD 2016), which contained 25 COPD patients were in stable state, 25 COPD patients were in acute exacerbation. Acute exacerbation was defined by the presence of an increase in at least two of the following symptoms.

Keywords: *Obstructive sleep apnea- Leukocyte differential count- Chemoradiotherapy- Chronic obstructive pulmonary disease*

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a major cause of morbidity and mortality throughout the world. Chronic Obstructive Pulmonary Disease (COPD), a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and comorbidities contribute to the overall severity in individual patients, According to GOLD, 2016 ***(Marc et al., 2016).***

Adenosine Deaminase (also known as adenosine aminohydrolase or ADA) is an enzyme involved in purine metabolism ***(Saboury et al., 2002).***

Its primary function in humans is the development and maintenance of the immune system ***(Wilson et al., 1991).***

ADA irreversibly deaminates adenosine, converting it to inosine by the substitution of the amino group for a keto group. Inosine can then be deribosylated (removed from ribose) by another enzyme called purine nucleoside phosphorylase (PNP), converting it to hypoxanthine. There are 2 isoforms of ADA: ADA1 and ADA2. ADA1 is found in most body cells ***(Wilson et al., 1991).***

It was found that in Chronic Obstructive Pulmonary Disease patients the Adenosine Deaminase activity decreases

and the Adenosine level increases. Decrease of Adenosine Deaminase activity may play an important role in the formation of pulmonary injury in COPD patients ***(Goodarzi et al., 2010).***

Aim of the Work

This work aim to study the Adenosine Deaminase activity in COPD patients compared with healthy subjects.

Chapter One

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

Definition:

Chronic Obstructive Pulmonary Disease (COPD), a common preventable and treatable disease; is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and comorbidities contribute to the overall severity in individual patients. The chronic airflow limitation characteristic of COPD is caused by a mixture of small airways disease "obstructive bronchiolitis" and parenchymal destruction "emphysema", the relative contributions of which vary from person to person ***(GOLD, 2016).***

COPD is a major cause of chronic morbidity and mortality throughout the world; many people suffer from this disease for years and die prematurely from it or due to its complications. Globally; the COPD burden is projected to increase in the coming decades because of continuous exposure to COPD risk factors and aging of the population ***(GOLD, 2016).***

Chronic bronchitis is defined clinically as chronic productive cough for 3 months in each of 2 successive years in

a patient; in whom other causes of productive chronic cough have been excluded ***(Agusti, 2005).***

Emphysema is defined pathologically, as the presence of permanent enlargement of the airspaces distal to the terminal bronchioles, accompanied by destruction of their walls and without obvious fibrosis ***(Agusti, 2005).***

Frequent exacerbations can result in a decreased health related quality of life, a decrease in lung function, an increased risk of hospitalization and an increased risk of mortality ***(Torzano et al., 2010)***.

Patients with COPD can experience periods of acute deterioration, which are called exacerbations. There are different definitions for an acute exacerbation of COPD (AECOPD). Generally accepted is the definition as in the guidelines of the World Health Organization, US National Heart Lung and Blood Institute and Global Initiative for Chronic Obstructive Lung Disease (GOLD), which define an exacerbation as "an event in the natural course of the disease characterized by a change in the patient's baseline dyspnea, cough, and/or sputum that is beyond normal day-to-day variations, is acute in onset and may warrant a change in regular medications in a patient with COPD" ***(Vestbo et al., 2013)***.

Prevalence:

The lowest estimates of prevalence are usually those based on self-reporting of a doctor diagnosis of COPD or equivalent condition. For example; most data show that: less than 6% of the population has been told that they have COPD these estimates may have value. However; since they may most accurately reflect the burden of clinically significant disease that is of sufficient severity to require health services ***(Halbert et al., 2006).***

The third National Health And Nutrition Examination Survey (NHANES 3) a large national survey conducted in the US between 1988 and 1994; which states that the prevalence of respiratory symptoms varied markedly by smoking status (current > ex-smoker > never). Among white males, chronic cough was reported by 24% of smokers, 4.7% of ex-smokers, and 4.0% of never smokers. The prevalence of chronic cough among white women was 20.6% in smokers, 6.5% in ex-smokers, and 5.0% in never smokers, Also There was a smaller gradient in the prevalence of chronic cough by race (white > black). The prevalence of airflow limitation was lower than the prevalence of respiratory symptoms found in the same study, but both sets of data reinforce the view; that smoking is the most important determinant of COPD prevalence in developed countries ***(National Center for Health Statistics, 1995).***