The Predictive Role of Neutrophil to Lymphocyte Ratio In Bronchial Asthma

Thesis

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List of Abbreviations

Abb.	Full term
ACT	Asthma control test
AHR	Airway hyper-responsiveness
CBC	Complete blood count
CRP	C-Reactive Protein
FEV-1	Forced expiratory volume
FVC	Forced Vital Capacity
GINA	Global initiative for asthma
HDM	House dust mite
ICS	Inhaled corticosteroids
IL	Interlukin
MBA	Major basic protien
MHC	Major histocompatibility
NK cells	Natural Killer cells
NLR	Neutrophil To Lymphocyte Ratio
PLR	Platelet to lymphocyte ratio
RFT	Respiratory function test
ROC	Receiver-operating characteristic
SPT	Skin prick test
TH-2	T-helper 2 cells
TNF	Tumor Necrosis Factor
WBCs	White blood cells

Abstract

Background: Neutrophil to lymphocyte ratio is an easy and rapid biomarker measured in peripheral blood, and plays a helpful role in assessing prognosis of bronchial asthma and its severity.

Aim: To assess NLR levels among atopic asthmatics, non-atopic asthmatics and healthy controls,.

Patient and methods: The study included 120 asthmatic patients and 60 healthy control.

Results: A highly significant difference was observed between asthmatic patients and healthy controls regarding neutrophil\lymphocyte ratio ($p<0.0001$)

Conclusion: Neutrophil to lymphocyte ratio is useful to assess asthma severity.

Keywords: Asthma, neutrophil to lymphocyte ratio

INTRODUCTION

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, chest tightness, and shortness of breath cough that vary overtime and in intensity, together with variable expiratory airflow limitation**,** airflow limitations may later become persistent ***(GINA, 2019)***.

Asthma not only causes respiratory inflammation, but also a systemic inflammation is present. The increased circulating pro inflammatory cytokines, such as interleukin (IL)-6 and tumor necrosis factor- (TNF-) participate in this inflammation. These pro inflammatory cytokines in asthmatic patients increase in immune cells, such as neutrophils and natural killer cells, and lead to production of acute phase reactants from the liver, such as C-reactive protein (CRP) ***(Juan et al., 2014)***.

There are four phenotypes of asthma ***(Wang et al., 2016),*** eosinophilic, neutrophilic, mixed granulocytic asthma, and paucicellular asthma according to the cellular counts of sputum, bronchoalveolar lavage fluid (BALF), or peripheral blood ***(Khatry et al., 2015).***

Recent studies have revealed that neutrophilic inflammation is related to the increase of disease severity ***(Uwaezuoke et al., 2018).***

An elevation in the neutrophil/lymphocyte percentage, which is a marker of inflammation, has been associated with disease severity hospitalization, malnutrition, and mortality in other chronic diseases such as cardiovascular, chronic obstructive pulmonary disease (COPD) and kidney ***(Fu et al., 2014).***

AIM OF THE WORK

The aim of the present study is to assess NLR levels among atopic asthmatics, non-atopic asthmatics and healthy controls. And to investigate the correlation between asthma severity and NLR in asthmatic patients, which is a chronic inflammatory disease.

Chapter 1

BRONCHIAL ASTHMA

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough which vary overtime and in intensity, together with variable expiratory airflow limitation**,** airflow limitations may later become persistent ***(GINA, 2019).***

Asthma is one of the most common chronic diseases, with an estimated 300 million patients affected by this disease worldwide. The Global Initiative for Asthma (GINA) 2004 estimated that more than 10% of the population in Australia, Brazil, Canada, New Zealand, Peru, England, and United States had asthma ***(GINA, 2017).***

Epidemiology of asthma

Prevalence of asthma:

The prevalence of asthma has increased in developed countries over the past 40-50 years and similar rates are emerging in developing countries, especially as they adopt western ways. Different factors underlie the development of asthma in the different parts of the world, atopy being a common risk factor in developed countries while non atopic

factors may be responsible for much of asthma in the developing countries ***(Marina et al., 2016).***

Figure (1): Prevalence of asthma symptoms among 13-14 years old ***(GINA, 2017).***

Asthma affects approximately 300 million people worldwide and approximately about 7.5% of adults in the United States between adults, asthma results in about 10.5 million physician office visits per year and affects approximately7.6% of whites, 8.7% of blacks, and 5.8% of Hispanics ***(Nanda and Wasan, 2020).***

In Egypt, the epidemiology, demographic characteristics, clinical characteristics of the patients, and prescription pattern vary completely between studied Egyptian asthmatic patients and others in different countries, which highlight individuality of each country and the requirement of national data on our health problems ***(Ahmed, 2011)***.

In a study was done at Mahalla Chest Hospital, and included 212 adult patients who had bronchial asthma with a wide