Computerized tomography of paranasal sinus in asthmatic children

Thesis

Submitted For fulfillment of Master Degree in pediatrics

By

Rasha Mohamed Hafez Abdle EL-Gawad

M.B., B.Ch

Under Supervision of

Prof. Dr.Iman Ahmed Ehsan Abdle-Meguid
Professor of Pediatrics
Faculty of Medicine-Cairo University

Prof.Dr.Hala Hamdi Shaaban

Professor of Pediatrics

Faculty of Medicine-Cairo University

Prof. Dr. Hassan Ali EL-Kiki

Professor of Radiodiagnosis

Faculty of Medicine-Cairo University

ACKNOWLEDGEMENT

First and foremost all thanks and praise be to Allah, the most merciful , for helping me to complete this work.

I would like to express my deepest gratitude and profound thanks to **Prof. Dr.Iman Ahmad Ehsan**, Professor of pediatrics, faculty of medicine, Cairo Uninversity for her constant encouragement, guidance and kind supervision.

My deepest appreciation and thanks to **Prof. Dr. Hala Hamdy Saaban** , Prof of Pediatrics, faculty of medicine,Cairo Uninversity for her valuable support and professional experience.

I will be never thankful to **Prof. Dr. Hassan Ali Elkiky**, Professor of radiodiagnosis, faculty of medicine, Cairo University for his great support, Valuable remarks and great effort that allowed completion of this work.

I am deeply grateful and thankful to my dad and my mam for the continuous support and help they offered me.

I would also like to thank my sisters, friends, colleagues, and my uncles who passed away while doing this work.

Lastly, my deepest thanks are extended to the children in Abo El Reish Hospital. I hope a lot of benefit will come out of this work for their sake.

ABSTRACT

Asthma is a chronic disease of airways with an underlying inflammatory component. Rhinosinusitis is a common comorbidity of asthma. The association between them seems to be more than epiphenomenon, but it is still a matter of controversy whether a causal relationship exists, wherein rhinosinusitis worsens asthma, or whether they are manifestations in different parts of the respiratory tract of the same underlying disease process. The aim of this study to determine the prevalence of rhinosinusitis in asthmatic children. Thirty asthmatic children aged 3 to 12 years (6.66±4.45year) were recruited for the precent study. Rhinosinusitis which detected by CT sinus is significantly detected (77% of our patients) in asthmatic children. The total esinophilic count is significantly high in asthmatic patients who had rhinosinusitis detected by CT sinus. Our results also revealed also that there is insignificant correlation of both total esinophilic count and IgE level with CT finding , this is in line with that rhinosinusitis and asthma are an expression of a common inflammatory process not always affected by allergy status in which esinophils and IgE play a central role.

Key words:

Asthma-Rhinosinusitis- Computed tomography (CT) scan

Content

List of abbreviation

ADAM33	A disintegrin and metalloprotease 33
AHR	Airway hyperresponsiveness
APC	Antigen-presenting cells
b-FGF	basic fibroblast growth factor
BK	Bradykinin
cAMP	cyclic-3,5-adenosine monophosphate
CD4	Cluster of differentiation antigen 4
CIS	Inhaled corticosteroids
CO	carbon monoxide
Cys-LTs	Cysteinyl leukotrienes
EIA	Exercise-induced asthma
FEV1	Forced expiratory volume in the frist second
FVC	froced vital capacity
GINA	Global strategy for asthma management and prevention
GM-CSF	granulocyte-macrophage colony-stimulating factor
IgE	Immunoglobulin E
IL	Interleukins
ISAAC	International Study of Asthma and Allergies in Childhood
LABA	Long acting Inhaled-B2 Agonists
LBK	lysylbradykinin
NO	nitric oxide
NSAIDs	non-steroidal anti-inflammatory drugs

O3	Ozone
OMC	ostiomeatal complex
PAF	Platelet activiating factor
PDGF	platelet-derived growth factor
PEFR	Peak expiratory flow rate
PGD	prostaglandins
RAST	radioallergosorbent test
SIT	Specific immunotherapy
SPT	Skin-prick testing
TGF-beta	transforming growth factor-beta
Th-cell	T helper cell
TNF	Tumor necrosis factor
Treg	T regulatory
VEGF	vascular endothelial growth factor

List of figures

List of tables

INTRODUCTION

Asthma have been documented to be increasing in children and young adult worldwide. Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role ***(GINA, 2008).*** The chronic inflammation is associated with airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread, but variable, airflow obstruction within the lung that is often reversible either spontaneously or with treatment ***(Kager and Basel, 2005)***.

Rhinosinusitis is a common comorbidity of asthma. The association between them seems to be more than epiphenomenon, but it is still a matter of controversy whether a causal relationship exists, wherein rhinosinusitis worsens asthma, or whether they are manifestations in different parts of the respiratory tract of the same underlying disease process ***(Wang et al., 2006).***

The observation that asthma and rhinosinusitis coexist in patients at a higher frequency than would be expected from the prevalence of each in general population provides a strong connection between the upper and lower airways ***(Fox and Lockey, 2003).***

Computed tomography (CT) scan of the sinuses are superior to plain radiographs when one needs to study the anatomy, assess pathology, or plan surgical approaches of the sinuses. It is the imaging technique of choice for the study of the nose and paranasal sinuses, and it is considered as "Gold Standard" for diagnosis and management of chronic sinusitis because it also provides an anatomic road map, when surgery is required ***(Talay et al., 2008).***

AIM OF THE WORK:

To detect the prevalence of rhinosinusitis (detected by CT sinus) in asthmatic children and to correlate between rhinosinusitis patients , total esinophilic count, and IgE level.

DEFINITION OF ASTHMA

Asthma is a chronic inflammatory disease of airways that affects approximately 300 million people worldwide ***(Kemp, 2003)***. Since the pathogenesis of asthma still not clear, much of its definition is descriptive. Based on the functional consequences of airway inflammation, an operational description of asthma is: Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role ***(GINA, 2008).***

The chronic inflammation is associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread, but variable, airflow obstruction within the lung that is often reversible either spontaneously or with treatment ***(Kager and Basel, 2005)***.

Its causes and physiopathological mechanisms are various. The final result is a recurrent obstructive bronchial process, with sibilants and/or dyspnea, which causes an upset in functional respiratory tests, among which the maximum respiratory peak flowmeter diminished for age, sex and height of patient ***(Hernando et al., 2004)***.

EPIDEMIOLOGY

Although asthma patterns vary throughout the world, considerable increases in both the prevalence of asthma and its severity have occurred globally over recent decades ***(Bach, 2002& Isolauri et al., 2004& Pearce et al., 2000)***, and in spite of significant advances in pulmonary medicine, the prevalence of asthma is increasing both in the developing as well as in the developed countries ***(Sekara, 2003)***.

Worldwide, 300 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 the developing countries. In developed countries, the prevalence is higher in low-income groups in urban areas and inner cities than in other groups ***(Mintz, 2004 &Girish et al., 2005).***

Based upon the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire, the 0-7 year incidence for childhood asthma is around 11% and 0-10 years is around 15%. The follow up of asthmatics indicated an almost 5% additional incidence in period 8-10 years of age ***(Roel et al., 2005)***.

In Egypt 23.2% of wheezy infants were proved to be real asthmatics, but the incidence of asthma among school children aged 5-15 years old was found to be 8.2% ***(El-Hefney et al., 1991 &EL Lawindi et al., 2003).***

Asthma may have its onset at any age. Thirty percent of patients are symptomatic by 1 year age, whereas 80% to 90% of asthmatic children have their first symptoms before age of 4 to 5 years ***(Sly, 1996)***.