Assessment of Small Airway Disease By Impulse Oscillometry In Relation to Asthma Control and Bronchial Hyperresponsiveness In Children

Thesis

Submitted for Partial Fulfillment of Master Degree in Pediatrics

By

Yasmin Swelam Farhan Abo Farhan
MB Bch , 2010, Tanta University

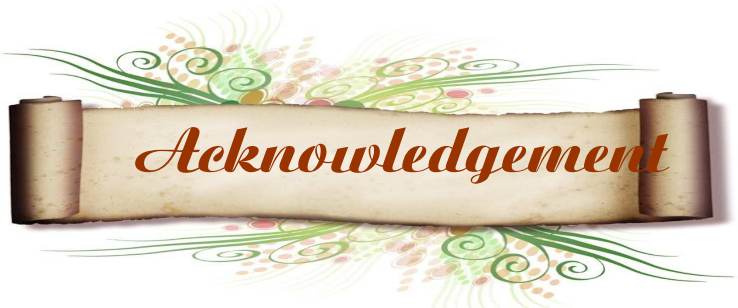
Supervisors

Professor Eman Ahmed Zaky
Professor of Pediatrics
Faculty of Medicine - Ain Shams University

Professor Eman Mahmoud Fouda
Professor of Pediatrics
Faculty of Medicine - Ain Shams University

Assistant professor Terez Boshra Kamel
Assistant Professor of pediatrics

Faculty of Medicine
Ain Shams University
2016



My greatest gratitude is to **ALLAH** whose guidance and support were the main motive behind accomplishing this work.

I would like to express my profound gratitude and sincere appreciation to **Prof. Dr. Eman Ahmed Zaki,** Professor of Pediatrics, Faculty of Medicine, Ain Shams University , for her great help and support and gentle guidance and insistence. Without her help, this work would never been accomplished.

I would also like to express my appreciation to **Prof.Dr. Eman Mahmoud Fouda,** Pediatrics, Faculty of Medicine, Ain Shams University , Professor of for her continuous help, guidance and encouragement.

I would like to express my deep appreciation and gratitude to **Assistant. Prof. Dr. Terez Boshra Kamel**, Assistant Professor of Pediatrics, Faculty of Medicine, Ain Shams University for her generous infinite help, supervision and continuous guidance throughout the whole work. I will never forget her meticulous efforts and precise criticism.

Finally, I am so grateful and I am deeply indebted to **soul of my husband , my Great Mother** and to **my Dearest Father** for their kindness, trust, unfailing support and much needed encouragement throughout this work.

Yasmin Swelam farhan

Dedication

I dedicate this work

With love to my

my husband and my family

LIST OF CONTENTS

LIST OF TABLES

Tab. No.	Title	Page No.

Tab. No.	Title	Page No.

LIST OF FIGURES

Fig. No.	Title	Page No.

List of abbreviation

Abbrev.	Full term

AAP: Asthma action plan

ACQ : Asthma control questionnaire

ACSS : Asthma control scoring system

ACT : Asthma control test

AHR : Airway hyperresponsivness

ATAQ : Asthma therapy assessment questionnaire

AX: Reaction area

BMI : Body mass index

COPD : Chronic obustructive pulmonary diseases

CVA : Cough variant asthma

EIA : Exercise included asthma

ETS : Environmental Tobacco smoking

FENO : Fractional exhaled nitric oxide

FEV_1: Forced expiratory volumein first second

FVC : Forced volume capacity

Abbrev.	Full term

GINA : Global Initative National institution of Asthma

HRCT : High resolution computed tomography

HRQOL : Health – related quality of life

HRV: Human rhinovirus

ICS : Inhaled corticosteroids

IGE : Immunoglobulin E

IL_{17} : Interleukin $_{17}$

IOS : Impulse oscillometry

LASS : Lara asthma symptom scale

MAQLQ : Mini asthma quality of life questionnaire

MEF $_{25-75}$: Mid expiratory flow $_{25-75}$

NSAI : Non small airway impairement

PEF : Peak expiratory flow

R_{20}: Resistance at 20Hz

R_{5-20}: Difference between $R_5$and R_{20} .

R5 : Resistance at 5Hz

SAI: Small airway impairement

SHS : Second hand smoke

Abbrev.	Full term

SPT : Skin prick test

SR : Steroid resistant

SS : Steroid sensitive

TH CELLS :T- helper cells

TNF : Tumar necrosis factor

Introduction

Asthma is a common chronic disorder of the airways that is characterized by the complex interaction of airway obstruction, bronchial hyperresponsiveness (BHR), and airway inflammation which leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing ***(Manuyakorn et al., 2013)***.

However, assessing asthma control in children is particularly challenging for many reasons including a discrepancy in perceived symptoms between the child and parents , and the poor correlation between symptoms and traditional objective tests such as spirometry . Therefore, the development of new, reliable, and non-invasive methods to assess of asthma control in children remains a priority and is essential for the effective treatment of asthma ***(Carroll et al., 2011).***

Recent studies have suggested that abnormalities in the small airways can contribute to the clinical expression of asthma.The small airways can be affected by inflammation, remodeling, and changes in the surrounding tissues, all contributing to small-airways dysfunction. Many systematic reviews to investigate the association between small-airways dysfunction on one hand and

clinical signs and symptoms of asthma on the other hand were done ***(Wiel et al., 2013)***.

Impulse oscillometry (IOS) has been increasingly used as a non invasive method to assess airway resistance and reactance in children. IOS requires minimal patient cooperation, it is effort-independent, and separately quantifies the degree of obstruction in central and peripheral airways. IOS has been shown to be useful in the diagnosis of small airway impairment in children***(Shi et al., 2012).***

Aim of study

The current cross sectional study aimed at assessing small airways' function in asthmatic children and correlating such function with the level of disease control , bronchodilator response comparing pre and post bronchodilator status.