

**ECHOCARDIOGRAPHIC EVALUATION OF CARDIAC
PERFORMANCE AND ITS RELATION TO
PULMONARY FUNCTION TESTS
IN ASTHMATIC CHILDREN**

THESIS

Submitted for partial fulfilment of the
M.D. Degree in Pediatrics

By

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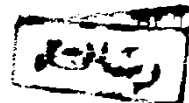
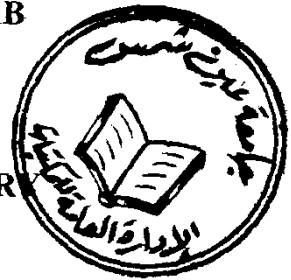
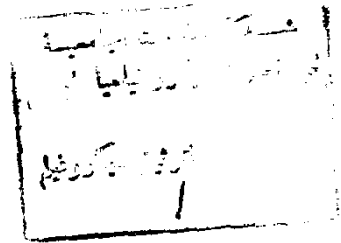
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

« قالوا سبحانك لا علم لنا إلا ما

علمتنا إنك أنت العليم الحكيم »

صدق الله العظيم

(سورة البقرة آية ٢٢)



Affectionately Dedicated To ...

The Soul of My Father

The Soul of My Professor

Professor Dr. Abd El Khalik Khattab

And To My Family

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ABBREVIATIONS

A-mode	Amplitude mode
A-wave	Late peak filling velocity
A.S.E.	American Society of Echocardiography
A/D	Analogue-digital
AC	Aortic closure
AMV	Anterior mitral valve leaflet
ANOVA	Analysis of variance test
AO	Aorta
ARV	Anterior right ventricular wall
AV	Aortic valve
B	B-lymphocytes
B-mode	Brightness mode
C3	Complement number 3
CC	Closing capacity
C _{cw}	Chest wall compliance
cDNA	Desoxyribonucleic acid
C _{dyn}	Dynamic compliance
C _L	Lung compliance
cm	Centimeters
C _{st}	Static compliance
C _T	Total compliance of the respiratory apparatus
CV	Closing volume
CW	Chest wall
E-wave	Early peak filling velocity
ECG (EKG)	Electrocardiogram
EDD	End diastolic dimension
EDV	End diastolic volume
EF%	Ejection fraction percent
EN	Endocardium of the left ventricle
EO	Eosinophils

EP	Epicardium of the left ventricle
ERV	Expiratory reserve volume
ESD	End systolic dimension
ESV	End systolic volume
FEF _{25%}	Forced expiratory flow after 25% of the FVC has been exhaled
FEF _{25-75%}	Mean forced expiratory flow during middle half of FVC
FEF _{50%}	Forced expiratory flow after 50% of the FVC has been exhaled
FEF _{75%}	Forced expiratory flow after 75% of the FVC has been exhaled
FEF _{max}	Maximum flow achieved during a forced exhalation, i.e., during the FVC maneuver
FEF _x	Forced expiratory flow, (where x is the duration on FVC curve)
FET _x	Forced expiratory time for a specified portion of the forced vital capacity.
FEV _t	Forced expiratory volume (timed)
FEV _t /FVC%	Forced expiratory volume (timed) to forced vital capacity ratio
FIF _{25%}	Forced inspiratory flow after 25% of the FVC has been inhaled
FIF _{50%}	Forced inspiratory flow after 50% of the FVC has been inhaled
FIF _{75%}	Forced inspiratory flow after 75% of the FVC has been inhaled.
FIF _x	Forced inspiratory flow, (where x is the duration on FVC curve)
FIVC	Forced inspiratory vital capacity
FRC	Functional residual capacity
FS%	Percentage fractional shortening
FVC	Forced vital capacity
G _{aw}	Conductance
H.L.A.	Human Histocompatibility Complex

H.R.	Heart rate
HCO ₃ ⁻	Bicarbonate level in the blood
i.e.	That is to say
IC	Inspiratory capacity
IC	Isovolumetric contraction
IgE	Immunoglobulin E
IL	Interleukin
IRV	Inspiratory reserve volume
IVC	Inspiratory vital capacity
IVS	Interventricular septum
LA	Left atrium
Lambda (λ)	Wavelength
LAW	Left atrial wall
LS	Left septum
LV	Left ventricle
LVD	Left ventricular dimension
LVET	Left ventricular ejection time
LVIVRP	Left ventricular isovolumetric relaxation period
LVOT	Left ventricular outflow tract
M-mode	Motion mode
M _{1, 2, 3}	Muscarinic subtypes of receptors in the respiratory system
MC	Mast cells
MC	Mitral closure
Mc	Mitral closure
MEFV	Maximal expiratory flow-volume
MHz	Mega Hertz (frequency unit)
MMEF	Maximum mid expiratory flow
mmHg	Millimeters of Mercury
MV	Mitral valve
MVV _x	Maximum voluntary ventilation
NCA	Neutrophil chemotactic activity
OS	Opening snap
PA	Pulmonary artery

PaCO ₂	Arterial carbon dioxide tension
PaO ₂	Arterial oxygen tension
PAW	Posterior aortic wall
Pc	Pulmonary Closure
PEF	Peak expiratory flow
PEP	Pre ejection period
PER	Pericardium
PFT	Pulmonary function tests
PLA	Posterior left atrial wall
PLV	Posterior left ventricular wall
PMV	Posterior mitral valve leaflet
PPM	Posterior papillary muscle
PRF	Pulse repetition frequency
PV	Pulmonary valve
PWT	Posterior wall thickness of left ventricle
Q-S	Electromechanical systole
RASF	Rapid acceleration of systolic flow of right ventricle
RAST	Radioallergosorbent test
R _{aw}	Airway resistance
RS	Right septum
R _T	Total respiratory resistance
RV	Residual volume
RV	Right ventricle
RV/TLC%	Residual volume to total lung capacity ratio
RVEDD	Right ventricular systolic dimension
RVEDV	Right ventricular diastolic volume
RVESV	Right ventricular end systolic volume
RVET	Right ventricular ejection time
RVH	Right ventricular hypertrophy
RVIVRP	Right ventricular isovolumetric relaxation period
RVOT	Right ventricular outflow tract
RVPEP	Right ventricular pre-ejection period
RVWT	Anterior right ventricular wall thickness

S	Sternum
S _{1, 2, 3, 4}	First, second, third and fourth heart sound
SG _{aw}	Specific conductance
ST	Septal thickness. At end systole (S) and at end diastole (D)
T	T-lymphocytes
T	Transducer
T.R.	Tricuspid regurge
TC	Tricuspid closure
TLC	Total lung capacity
TM-mode	Time-motion mode
TV or V _t	Tidal volume
TV	Tricuspid valve
V _A	Alveolar gas volume
VC	Vital capacity
VIP	Vasoactive inhibitory peptide
V _L	Actual volume of the lungs
VLA-1	Very late activation antigen
V _{max} x	Forced expiratory flow related to total lung capacity
ΔP	Change in pressure
ΔV	Change in flow in liters per second

CONTENTS

	Page
Acknowledgement	i
Abbreviations	iii
Contents	viii
List of Tables	ix
List of Figures	xii
Introduction	1
Aim of the Work	3
Review of Literature	4
Chapter I: Bronchial Asthma in Infancy and Childhood	4
Chapter II: Pulmonary Function Tests	48
Chapter III: Principles of Echocardiography	80
Chapter IV: Effect of Bronchial Asthma on Cardiovascular Function	116
Subjects and Methods	139
Results and Their Analysis	166
Discussion	261
Summary and Conclusion	286
Recommendations	289
References	291
Arabic Summary	347

LIST OF TABLES

	Page
Table 1: Mononuclear phagocyte products having a role in asthma syndromes.	25
Table 2: Pathological changes in asthma and the mediators possibly responsible.	38
Table 3: Pathologic changes in the airways of bronchial asthma.	39
Table 4: Arterial blood gases profile in asthma.	45
Table 5: Indications for pulmonary function testing in asthmatic children.	49
Table 6: Prediction equations for spirometry in children.	58
Table 7: Prediction equations for lung volumes in children.	58
Table 8: Differential diagnosis of obstructive and restrictive lung diseases.	59
Table 9: Flow diagram for interpretation of spirometric data.	60
Table 10: Values of pulmonary function in infants: in normal term, in respiratory distress syndrome and in bronchopulmonary dysplasia.	79
Table 11: Maximal peak velocities in normal individuals meter per second recorded by Doppler ultrasound.	102
Table 12: The spectrum of pulmonary hypertension in paediatric patients.	122
Table 13: Classification of cor pulmonale in children.	125
Table 14: ANOVA test between mean FVC% values of the four different groups.	167
Table 15: ANOVA test between mean FEV1% values of the four different groups.	169
Table 16: ANOVA test between mean FEF25%-75% of the four different groups.	171
Table 17: ANOVA test between mean FEF25% values of the four different groups.	173
Table 18: ANOVA test between mean FEF50% values of the four different groups.	175
Table 19: ANOVA test between mean pulmonary compliance values of the four different groups.	177
Table 20: ANOVA test between mean pulmonary resistance values of the four different groups.	179
Table 21: ANOVA test between mean right ventricular ESV values of the four different groups.	181
Table 22: ANOVA test between mean right ventricular EDV values of the four different groups.	183
Table 23: ANOVA test between mean RVPEP values of the four different groups.	185

	Page
Table 24: ANOVA test between mean RVET values of the four different groups.	187
Table 25: ANOVA test between RVPEP/ET ratio values of the four different groups.	189
Table 26: ANOVA test between mean tricuspid E-F slope values of the four different groups.	191
Table 27: ANOVA test between mean tricuspid E-wave values of the four different groups.	193
Table 28: ANOVA test between mean tricuspid A-wave values of the four different groups.	195
Table 29: ANOVA test between mean tricuspid E/A ratio values of the four different groups.	197
Table 30: ANOVA test between mean RVIVRP values of the four different groups.	199
Table 31: ANOVA test between mean RVWT values of the four different groups.	201
Table 32: ANOVA test between mean right ventricular EDD values of the four different groups.	203
Table 33: ANOVA test between mean right ventricular rapid acceleration of systolic flow values of the four different groups.	205
Table 34: ANOVA test between mean left ventricular ESD values of the four different groups.	207
Table 35: ANOVA test between mean left ventricular EDD values of the four different groups.	208
Table 36: ANOVA test between mean left ventricular FS% values of the four different groups.	209
Table 37: ANOVA test between mean left ventricular EF% values of the four different groups.	210
Table 38: ANOVA test between mean aortic acceleration time values of the four different groups.	211
Table 39: ANOVA test between mean aortic deceleration time values of the four different groups.	212
Table 40: ANOVA test between mean aortic peak velocity values of the four different groups.	213
Table 41: ANOVA test between mean time velocity integral of aorta values of the four different groups.	214
Table 42: ANOVA test between mean left ventricular ejection time values of the four different groups.	215
Table 43: ANOVA test between mean left atrial dimension values of the four different groups.	216
Table 44: ANOVA test between mean aortic dimension values of the four different groups.	217
Table 45: ANOVA test between mean left atrium /aortic dimension values of the four different groups.	218

	Page
Table 46: ANOVA test between mean Mitral E-F slope values of the four different groups.	219
Table 47: ANOVA test between mean Mitral E-wave values of the four different groups.	220
Table 48: ANOVA test between mean Mitral A wave values of the four different groups.	221
Table 49: ANOVA test between mean Mitral E/A ratio values of the four different groups.	222
Table 50: ANOVA test between mean LVIVRP values of the four different groups.	223
Table 51: ANOVA test between mean Mitral E deceleration time values of the four different groups.	224
Table 52: ANOVA test between mean Mitral flow E-deceleration slope values of the four different groups.	225
Table 53: ANOVA test between mean eccentricity index at end systole values of the four different groups.	226
Table 54: ANOVA test between mean eccentricity index at end diastole values of the four different groups.	228
Table 55: Correlation between pulmonary function tests and echocardiographic indices of right ventricle in severe asthmatic children.	230
Table 56: Correlation between pulmonary function tests and arterial blood gases in severe asthmatic children.	244
Table 57: Pulmonary function data, ECG and echocardiography in mild cases (Group A).	245-248
Table 58: Pulmonary function data, ECG and echocardiography in moderate cases (Group B).	249-252
Table 59: Pulmonary function data, ECG and echocardiography in severe cases (Group C).	253-256
Table 60: Pulmonary function data, ECG and Echocardiography in non-asthmatic children (Group D).	257-260