



# **ECG Changes in Acute Severe Asthma**

*Thesis*

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# List of Contents

Title	Page No.
List of Tables .....	5
List of Figures .....	7
List of Abbreviations .....	11
Introduction.....	- 1 -
Aim of the Work .....	15
Bronchial Asthma .....	16
Definition .....	16
Epidemiology .....	16
Etiology of asthma.....	17
Pathophysiology.....	20
Classification of bronchial asthma .....	28
Treatment of Wheezing Preschool Children and of School Children with Asthma in between the attacks .....	29
Treatment of acute exacerbation bronchial asthma attack.....	33
The Effect of Bronchial Asthma and Its Treatment on the Heart .....	37
Pathophysiological mechanisms contributing to cardiac complications in patients with bronchial asthma during the acute attack: .....	37
2D and Tissue Doppler Echocardiographic changes seen with bronchial asthma: .....	40
Cardiac complications that may occur due to bronchial asthma: .....	43
The effect of bronchodilators on the heart:.....	48

# List of Contents

Title	Page No.
ECG Changes in Bronchial Asthma.....	52
1. Sinus tachycardia: .....	53
2. Supraventricular Tachycardia: .....	54
3. P pulmonale: .....	55
4. Right axis deviation:.....	57
5. Right ventricular strain: .....	59
6. Right bundle branch block: .....	60
7. Poor progression of R wave in precordial leads.....	62
8. ST segment changes: .....	63
9. Premature Atrial Contraction and Premature ventricular contraction: .....	64
10. U wave: .....	65
11. Prolonged QT interval .....	66
Patients and Methods .....	69
Results .....	81
Discussion .....	127
Summary .....	142
Conclusion .....	147
Recommendations .....	148
References .....	149
Arabic Summary	

# List of Tables

Table No.	Title	Page No.
<b>Table 1:</b>	Diagnosis of bronchial asthma based on GINA guidelines .....	24
<b>Table 2:</b>	Manifestations of an acute episode .....	25
<b>Table 3:</b>	GINA classification was used to determine the severity of the acute asthmatic attack .....	70
<b>Table 4:</b>	Basic data of the included patients .....	81
<b>Table 5:</b>	Assessment of patients upon presentation with acute asthmatic attack.....	82
<b>Table 6:</b>	Relation of severity of acute asthmatic attack with demographic and clinical data of the studied patients .....	84
<b>Table 7:</b>	ECG changes of the studied patients.....	86
<b>Table 8:</b>	ECG changes in the first four days among all the studied patients.....	88
<b>Table 9:</b>	Relation of severity of acute asthmatic attack with initial ECG .....	90
<b>Table 10:</b>	Relation of severity of acute asthmatic attack with ECG changes on day 2 .....	92
<b>Table 11:</b>	Relation of severity of acute asthmatic attack with ECG changes on day 3 .....	94
<b>Table 12:</b>	Relation of severity of acute asthmatic attack with ECG changes on day 4 .....	96
<b>Table 13:</b>	Relation between Number of medications used and ECG changes on day 2 .....	97
<b>Table 14:</b>	Relation between number of medications and ECG changes on day 3.....	99

## List of Tables *cont...*

Table No.	Title	Page No.
<b>Table 15:</b>	Relation between number of treatments and ECG changes at day 4.....	101
<b>Table 16:</b>	Relation between use of theophylline and atrial ectopic, sinus tachycardia and QTc interval.....	103
<b>Table 17:</b>	2D and tissue doppler findings in studied patients during the acute attack.....	123
<b>Table 18:</b>	Relation of severity of acute asthmatic attack with 2D and tissue doppler findings of right ventricle .....	124
<b>Table 19:</b>	Relation between severity of bronchial asthma and Echo findings of right ventricle .....	125
<b>Table 20:</b>	Relation between severity of pulmonary hypertension with p-pulmonale .....	126

# List of Figures

Fig. No.	Title	Page No.
<b>Figure 1:</b>	Etiology and pathogenesis of asthma .....	19
<b>Figure 2:</b>	Asthmatic inflammation (effector phase).....	23
<b>Figure 3:</b>	A 4-year-old boy with asthma .....	27
<b>Figure 4:</b>	Diagram showing stepwise treatment of bronchial asthma.....	31
<b>Figure 5:</b>	Inflammatory mediators released affecting the heart .....	40
<b>Figure 6:</b>	Necrosis of myocytes and associated inflammatory infiltrate in myocardial infarction.....	47
<b>Figure 7:</b>	ECG showing regular sinus tachycardia.....	54
<b>Figure 8:</b>	Supraventricular tachycardia.....	55
<b>Figure 9:</b>	ECG showing P-pulmonale .....	57
<b>Figure 10:</b>	The hexaxial reference system that is used to determine the heart's electrical axis in the frontal plane.....	58
<b>Figure 11:</b>	ECG of a 40 years old showing right bundle branch block.....	62
<b>Figure 12:</b>	ECG showing poor R wave progression .....	63
<b>Figure 13:</b>	ECG showing ST segment depression in 60 years old patient with symptoms of ischemia .....	64
<b>Figure 14:</b>	ECG showing PVC bigeminy in a patient with hypokalemia .....	65
<b>Figure 15:</b>	QT interval measurement.....	67
<b>Figure 16:</b>	Centile for Respiratory rate according to age ...	72
<b>Figure 17:</b>	Centiles for Heart rate according to age .....	73
<b>Figure 18:</b>	12 leads ECG placement .....	76
<b>Figure 19:</b>	Echocardiography machine: Vivid E9 (GE, Horton, Norway).....	79
<b>Figure 20:</b>	Severity of acute asthmatic attack .....	83

## List of Figures cont...

Fig. No.	Title	Page No.
<b>Figure 21:</b>	Relation of severity of acute asthmatic attack with clinical data of the studied patients .....	85
<b>Figure 22:</b>	ECG changes of the studied patients. ....	87
<b>Figure 23:</b>	Sinus tachycardia, p-pulmonale, right axis deviation, RV strain and Q wave inferior lead in the first four days among the studied patients. ....	89
<b>Figure 24:</b>	Relation of severity of acute asthmatic attack with sinus tachycardia.....	91
<b>Figure 25:</b>	Relation of severity of acute asthmatic attack with right axis deviation and RV strain in initial ECG .....	91
<b>Figure 26:</b>	Relation of severity of acute asthmatic attack with sinus tachycardia on Day 2.....	93
<b>Figure 27:</b>	Relation of severity of acute asthmatic attack with RV strain on day 2.....	93
<b>Figure 28:</b>	Relation of severity of acute asthmatic attack with RV strain on day 3.....	95
<b>Figure 29:</b>	Number of medications and sinus tachycardia on day 2 .....	98
<b>Figure 30:</b>	Number of medications and sinus tachycardia on day 2. ....	98
<b>Figure 31:</b>	Number of medications and sinus tachycardia on day 3 .....	100
<b>Figure 32:</b>	Relation of number of medications with atrial ectopic on day 3. ....	100
<b>Figure 33:</b>	Relation between number of treatments with atrial ectopic on day 4.....	102
<b>Figure 34:</b>	Relation between use of theophylline and atrial ectopic. ....	103
<b>Figure 35:</b>	Relation between use of theophylline and sinus tachycardia.....	104

## List of Figures *cont...*

Fig. No.	Title	Page No.
<b>Figure 36:</b>	Initial ECG of a 9-year-old patient presenting with moderate acute asthmatic attack showing low voltage and sinus tachycardia for age. Heart rate is 140 bpm.....	105
<b>Figure 37:</b>	ECG of patient (14) on Day 3 after resolution of the acute attack showing normal voltage. Heart rate = 100 bpm. ....	106
<b>Figure 38:</b>	Initial ECG of a 7- year old patient presenting with severe attack showing low voltage, sinus tachycardia for age .....	107
<b>Figure 39:</b>	ECG of patient (28) on day 2 showing low voltage, sinus tachycardia (HR=145), RV strain and right axis deviation .....	108
<b>Figure 40:</b>	ECG of patient (28) on day 3 showing sinus tachycardia (HR=145) and RV strain .....	109
<b>Figure 41:</b>	ECG of patient (28) on day 4 showing normal voltage and sinus rhythm with resolution of RV strain and sinus tachycardia (HR= 100 bpm) .....	110
<b>Figure 42:</b>	Initial ECG of patient (47), 6-year-old patient presenting with severe asthmatic attack .....	111
<b>Figure 43:</b>	ECG on day 2 of patient (47) showing sinus tachycardia (HR = 140 bpm) and incomplete RBBB in lead V1.....	112
<b>Figure 44:</b>	ECG on day 3 of patient (47) showing normal voltage, HR = 124 bpm and incomplete RBBB in V1.....	113
<b>Figure 45:</b>	Initial ECG of patient (27), 10-year-old patient presenting with severe attack.....	114

## List of Figures *cont...*

Fig. No.	Title	Page No.
<b>Figure 46:</b>	ECG of patient (27) showing sinus tachycardia with HR= 160 (more than initial ECG), RV right axis deviation and RV strain on day 2.....	115
<b>Figure 47:</b>	ECG of patient (27) on day 3 with normal voltage, resolution of sinus tachycardia, RV strain and right axis deviation .....	116
<b>Figure 48:</b>	Initial ECG of patient (5), 8 years old patient presenting with severe attack showing sinus tachycardia (HR=150 bpm) and RV strain in leads V1, V2 and V3.....	117
<b>Figure 49:</b>	ECG of patient (5) showing sinus tachycardia (HR= 150 bpm), frequent premature atrial contractions in leads I, II, II, aVR, aVF, aVL and RV strain.....	118
<b>Figure 50:</b>	ECG of patient (5) showing sinus rhythm (HR= 95 bpm) and resolution of RV strain.....	119
<b>Figure 51:</b>	Initial ECG of patient (12) 6 years old presenting with severe attack.....	120
<b>Figure 52:</b>	ECG of patient (12) showed HR= 90, RV strain, with normal QTc interval and resolution of right axis deviation and P-pulmonale on day 2 .....	121
<b>Figure 53:</b>	ECG of patient (12) on day 3 with HR = 90 and resolution of all changes during acute asthmatic attack.....	122
<b>Figure 54:</b>	Association between severity of bronchial asthma and Echo findings.....	125
<b>Figure 55:</b>	Relation between severity of pulmonary hypertension and p-pulmonale. ....	126

# List of Abbreviations

Abb.	Full term
<i>ADAM33</i> .....	<i>Adesintergrin and metalloproteinase 33</i>
<i>AHR</i> .....	<i>Airways hyperresponsiveness</i>
<i>AV</i> .....	<i>Atrioventricular</i>
<i>Bpm</i> .....	<i>Beat per minute</i>
<i>cAMP</i> .....	<i>Cyclic adenosine monophosphate</i>
<i>DPPA</i> .....	<i>Dipeptidyl peptidase 10</i>
<i>ECG</i> .....	<i>Electrocardiography</i>
<i>ET</i> .....	<i>Ejection time</i>
<i>ET-1</i> .....	<i>Endothelin</i>
<i>ETS</i> .....	<i>Environmental tobacco smoke.</i>
<i>FEV<sub>1</sub></i> .....	<i>Forced expiratory volume in 1 sec</i>
<i>FVC</i> .....	<i>Forced vital capacity</i>
<i>GINA</i> .....	<i>Global Initiative for Asthma,</i>
<i>GPRA</i> .....	<i>G-protein related receptor for asthma</i>
<i>HR</i> .....	<i>Heart rate</i>
<i>ICSs</i> .....	<i>Inhaled corticosteroids</i>
<i>IFN-<math>\alpha</math></i> .....	<i>Interferon-<math>\alpha</math></i>
<i>IgE</i> .....	<i>Immunoglobulin E</i>
<i>IL</i> .....	<i>Interleukin</i>
<i>IQR</i> .....	<i>Interquartile range</i>
<i>IV</i> .....	<i>Intravenous</i>
<i>IVCT</i> .....	<i>Isovolumetric contraction time</i>
<i>IVRT</i> .....	<i>Isovolumetric relaxation time</i>
<i>LABA</i> .....	<i>Long-acting beta2-agonists</i>
<i>LQTS</i> .....	<i>Long QT Syndrome</i>
<i>LTRA</i> .....	<i>Leukotriene receptor antagonist</i>
<i>LV</i> .....	<i>Left-ventricle</i>
<i>MCBN</i> .....	<i>Myocardial contraction band necrosis</i>
<i>Mg</i> .....	<i>Magnesium</i>
<i>MPI</i> .....	<i>Myocardial performance index</i>
<i>PAC</i> .....	<i>Premature atrial contraction</i>

# List of Abbreviations

Abb.	Full term
<i>PaCO<sub>2</sub></i> .....	<i>Carbon Dioxide Pressure</i>
<i>PHF11</i> .....	<i>Plant homeodomain zinc finger protein 11</i>
<i>pMDI</i> .....	<i>Pressurized metered dose inhalers</i>
<i>PSAP</i> .....	<i>Pulmonary systolic arterial pressure</i>
<i>P-value</i> .....	<i>Probability</i>
<i>PVC</i> .....	<i>Premature ventricular contraction</i>
<i>RAD</i> .....	<i>Right axis deviation</i>
<i>RAP</i> .....	<i>Right atrial pressure</i>
<i>RBBB</i> .....	<i>Right bundle branch block</i>
<i>RR</i> .....	<i>Respiratory rate</i>
<i>RV</i> .....	<i>Right-ventricle</i>
<i>RVH</i> .....	<i>Right ventricular hypertrophy</i>
<i>SA</i> .....	<i>Sinoatrial</i>
<i>SABA</i> .....	<i>Short-acting B2 agonist</i>
<i>SD</i> .....	<i>Standard deviation</i>
<i>SPINK5</i> .....	<i>Serine protease inhibitor Kazal type 5</i>
<i>SVT</i> .....	<i>Supraventricular tachycardia</i>
<i>TDE</i> .....	<i>Tissue Doppler Echocardiography</i>
<i>TFPV</i> .....	<i>Transmitral flow propagation velocity</i>
<i>Th</i> .....	<i>T helper</i>
<i>TNF-<math>\alpha</math></i> .....	<i>Tumor necrosis factor-alpha</i>
<i>URTI</i> .....	<i>Upper respiratory tract infection</i>
<i>VBG</i> .....	<i>Venous blood gases</i>

## INTRODUCTION

**A**sthma is considered a heterogenous disease, characterized by chronic inflammation of the airways resulting in airflow obstruction, which may completely or partially reverse with or without specific therapy. Airway inflammation is the result of interactions between various cells, cellular elements, and cytokines (*Holgate and Polosa, 2008*).

Bronchial asthma is one of the most common chronic inflammatory disorders of childhood. The prevalence of bronchial asthma has further increased over the last decades, especially so in children, and still there is no sound explanation for this increase (*Akinbami et al., 2009*).

In susceptible individuals, airway inflammation may cause recurrent or persistent bronchospasm, which causes symptoms that include wheezing, breathlessness, chest tightness, shortness of breath and cough, particularly at night (early morning hours) or after exercise (*Hargreave, 2009*).

It imposes a serious burden on patients, their family and the community. It causes respiratory symptoms, limitation of activities and flare ups, that sometimes require immediate medical attention and may be fatal (*Global initiative for asthma, 2006*).

Although bronchial asthma has been accused in causing arrhythmias and affecting the cardiac function and anatomy

especially during the acute exacerbation attacks, there isn't much literature available discussing its effect on the heart, its function and electrophysiology (*Shedeed, 2010*).

It is essential to study the role of bronchial asthma in cardiac dysfunction, this will not only help clinicians to assess the risk of death and institute the appropriate level of care, but it will also help to explain the mechanism of death and to guide for other treatment (*Salpeter et al., 2004*).

## **AIM OF THE WORK**

**T**his work was done to study the various ECG abnormalities in acute asthma as well as the relation between the ECG abnormalities with severity of airway obstruction. Furthermore, the work included the effect of bronchodilators used on the ECG and their potential reversibility after the acute episode.