

ELECTROCARDIOGRAPHIC STUDY ON THE SIGNIFICANCE OF CHEST PAIN IN PATIENTS WITH ACUTE ASTHMATIC ATTACK

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Abstract

Background: Patients with acute asthma are usually presented with dyspnoea, wheezing and cough, but some are presented with chest pain, which is usually overlooked. The pain may be part of the clinical features or due to associated ischaemic heart disease.

Objective: To assess the origin of chest pain in acute asthmatic patients.

Methods: Two hundred patients with acute asthmatic attacks were studied for their symptoms and those with chest pain were especially selected and studied by ECG with other investigations. ECG was done on admission and repeated 48 hours later.

Results: Thirty cases out of the total 200 with acute asthma were found to have chest pain [15%] as alone or part of the clinical features. The cases with chest pain were commoner in patients older

Than 50 years [80%]. ST depression and T wave inversion were the most common abnormalities to be found in cases with chest pain [67%]. After 48 hours some of the ECG changes return back to normal and the remaining cases with ECG changes were [40%] which was considered as a substantial ischaemia.

Conclusion: It appears that chest pain occurring in some of the acute asthmatic cases may be due to ischaemia rather than only as a part of the clinical presentation and it is recommended to be investigated by repeated ECG in all cases.

Key words: Asthma, Chest pain, Ischaemic heart disease

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Introduction

Bronchial asthma is presented usually with various clinical features including dyspnoea, wheezing, chest tightness, and cough and diagnosis can often be made quickly and accurately from the patient description and complaints, but sometimes difficulty arises to differentiate between pain and tightness. Peak expiratory flow rate measurement may be needed with other investigations including eosinophils count, chest x-ray, electrocardiography [ECG], and specific mediators to confirm the diagnosis and complications¹.

Doctors caring for the management of acute asthmatic patients have often faced

Patients who complain of chest or epigastric pain alone or with the association of other

Symptoms, which occur during or after cessation of acute attack².

The chest pain in acute asthmatic attack is usually overlooked, because the severity of other symptoms masks it³, however chest pain as the presenting symptom is seldom noted. Non-cardiac pain is a common clinical problem in patients with various respiratory diseases, but some of these pains could be cardiac rather than respiratory in origin⁴.

In this study of patients with acute asthmatic attacks, a repeated ECG with other investigations have been performed in order to know the significance of chest pain associated with, and whether it is part of the clinical feature or an ischaemic anginal pain.

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Patients and Methods

Tow hundred cases with acute asthma were studied at casualty and as inpatients regarding various symptoms analysis during the period between 1998-2005 at Al-Karama Teaching Hospital, and Al-Kindy Teaching Hospital in Baghdad city. They were 110 female and 90 male patients. Their age ranges between 15-70 year.

All patients had an ECG examination on admission and another ECG after 48 hours. Chest pain, dyspnoea, and

Tightness was recorded in studied patients with other symptoms of asthma. The chest pain varies in duration between few minutes to many hours and was acute and not recorded by the patients previously.

Results

Of the total 200 cases with acute asthma, only 30 cases found to have chest pain [15%] while most of them [85%] had other symptoms but without chest pain. Wheezing and tight chest were the most predominant symptoms as shown in table 1.

Table 1: Clinical presentation of acute asthma causes (200cases)

Symptom	No. /cases	Percentage
Wheezing	190	95
Tightness	190	95
Cough	120	60
Dyspnoea	60	30
Chest pain	30	15

There was no difference in the clinical presentation between male and female patients, but the cases with chest

pain were seen in patients older than 50 year [80%] compared to younger age group [20%] as seen in table 2.

Table 2: Age related chest pain in asthmatic patients

Age in years	No./chest pain cases	Percentage
> 50	24	80
<50	6	20
Total	30 cases	100

The site of pain was retrosternal in 50% of cases while less frequent in other chest areas as seen in table 3.

Interpretation of ECG changes revealed that T wave inversion and ST segment depression were the commonest findings and was recorded in 12 cases (40%). Only one patient with chest pain found to have acute inferolateral myocardial infarction. Four cases with ventricular ectopic beats were found (13%) which were unrelated to the T wave and ST segment

Changes. The T wave inversion and ST segment depression were in 20 cases of the total number of 30 cases with chest pain (67%). The ECG findings are shown in table 4.

ECG was repeated after 48 hours of the acute attack and it was found that 7 out of 12 T wave inversion and 5 out of 8 ST segment depression returned back to normal which means about 60% of the abnormalities were disappeared. There was no significant difference in ECG changes

between male and female patients with acute asthmatic attacks and chest pain.

Table 3: The site of chest pain in acute asthmatic patients

Site	No./ cases	Percentage
Retrosternal	15	50
Left sided	8	27
Epigastric	4	13
Right sided	3	10
Total	30 cases	100

Table 4: ECC changes in asthmatics with chest pain (30 cases)

ECG changes	No. of cases	Percentage
T inversion	12	40
ST depression	8	27
Ventricular ectopic beats	4	13
Myocardial infarction	1	3
Normal ECG	5	17
Total	30 cases	100

Discussion

Asthma is an extremely common disorder and though most common before the age of 25 years, it may develop at any time throughout life. The worldwide prevalence of asthma has increased more than 40% since the late 1970. It is among the most common reason to seek medical treatment⁵.

The symptoms of asthma consist of a triad of dyspnoea, cough and wheezing, the last often being regarded as the sine qua non. In its most typical form all these symptoms coexist⁶.

Asthma is not a uniform disease but rather a broad spectrum dynamic clinical syndrome and the variable nature of symptoms is a characteristic feature⁷. In this study acute asthmatic patients with chest pain were selected and studied for the significance of their pain. The chest pain was in 50% retrosternal. The other 50% recorded sites of pain, were left sided, epigastric and right sided. ECG on admission revealed that 67% of abnormalities included

T and ST segment but the repeat ECG after 48 hours showed only 15% of them persist and considered. Unfortunately it was not possible to compare our ECG changes to previous patients ECG because they were unavailable.

As a substantial ischaemia which were more evident in elder population. A study was done by Karwat k. in 2002 on asthmatic patients with and without chest pain showed 18.9% of patients had ST-T changes⁸. In comparison to this study which showed only 10% ST-T changes in all patients with and without pain and which rises up to 67% in those specifically with chest pain.

Out of the 30 cases with chest pain in this study, one was found to have myocardial infarction, which was confirmed, by ECG and cardiac enzymes. A similar report by Rubinsztajn et al was published on a 39 year old woman without any previous history of heart disease⁹.

Various studies regarding the cause of death in asthma agreed that the top causes of death were acute myocardial infarction, ischaemic heart disease and heart failure and this is explained by hypoxia and the adverse effect of beta-agonist drugs with tachycardia and hypokalaemia^{10, 11}.

It is also reported that the use of inhaled beta-agonists were associated with a two fold increased risk of primary cardiac arrest among patients with asthma especially when inhaled steroids were not used¹². In various studies of ECG in acute asthma, many of the ECG changes have been observed to disappear within hours after initiation of effective asthma therapy, but return of ECG to normal may be delayed for up to 9 days^{13, 14}.

The effect of asthma on cardiovascular system has been appreciated for decades. During normal inspiration there is an increased venous return to the right heart as intrathoracic pressure becomes more negative¹⁵⁻¹⁷. In contrast maneuvers that increase intrathoracic pressure such as Valsalva may decrease venous return that transiently decrease cardiac output and systemic blood pressure and during acute asthmatic exacerbation the interrelation between ventilation and cardiovascular function becomes much more complex with flattening of the interventricular septum interfering with ventricular systolic function¹⁸⁻²⁰.

There are several factors that predispose to myocardial damage including hypoxia, vasospasm related to mediators release and electrolytes disturbances and dysarrhythmia associated with medications used to treat asthma^{21, 22}.

Hypovolaemia may be a complication of asthma reflecting increased insensible fluid losses from excessive sweating or hyperventilation with decreased fluid intake in severely dyspnoeic patient and the patient may become hypotensive during acute exacerbation²³. It is postulated that dyspnoea associated with severe asthma may mask the pain of myocardial ischaemia. Other complications associated with acute

asthma including metabolic acidosis, hypoxaemia, vasospasm which may lead to myocardial contraction band-necrosis, circadian fluctuation in epinephrine and cortisol level, pulmonary hypertension, increased intrathoracic pressure and left ventricular afterload which may lead to pulmonary oedema²⁴.

It is concluded from all above that chest pain associated with acute asthma attacks may signify underlying ischaemic episode which is usually missed and it is recommended to consider chest pain in acute asthmatic attack as an important association and to be investigated carefully to avoid cardiac complications in addition to the complications of underlying acute asthmatic episode.

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