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RESEARCH ARTICLE

RISK OF ARRHYTHMIA IN ASTHMATIC CHILDERN.

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Abstract

Introduction:- Bronchial asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. Asthma is a clinically classified into; mild intermittent , mild, moderate and severe persistent asthma. Asthma may also be classified as atopic or non-atopic. symptoms include wheezing, coughing, chest tightness , and shortness of breath.

Aim of the work:- Identification of risk factors in asthmatic children and there relation with arrhythmia. **S**

Subjects and methods:- This study was conducted on 100 children suffering from bronchial asthma aged from 5-12 years who are attendants of pediatric chest unit and pediatric asthma outpatient clinic in Banha university.

Results:- In the studied asthmatic children; 65% male and 35% female also 20 children (20%) had abnormal ECG changes (sinus tachycardia) and the most common drug causing arrhythmia is inhaled anticholinergic (IAC).

Conclusion:- Risk of arrhythmia in asthmatic children in acute exacerbation or in between attacks using medications especially inhaled anticholinergics.

Introduction:-

Asthma is a common chronic inflammatory disease of the airways characterized by; variable and recurring symptoms , reversible airflow obstruction , and bronchospasm. symptoms include wheezing, coughing, chest tightness , and shortness of breath. Asthma is a clinically classified into; mild intermittent , mild, moderate and severe persistent asthma. Asthma may also be classified as atopic or non-atopic. [1,2]

It is thought to be caused by a combination of genetic and environmental factors. Treatment of acute symptoms is usually with an inhaled short acting beta- 2 agonist(such as salbutamol) . Symptoms can be prevented by avoiding triggers, such as allergens and irritants, and by inhaling corticosteroids . Leukotriene antagonists are less effective than corticosteroids and thus less preferred. [3]

An arrhythmia is an abnormal heart rhythm. The child with an irregular heart rate is a common problem that has numerous etiologies ranging from normal benign variants to malignant arrhythmias. Determining the underlying cause of an irregular rhythm is important, as it may be a life-threatening or serious condition. In the majority of children, the cause of an irregular heart rate is identified by an in-depth history and physical examination, and electrocardiogram, which can be completed by the primary clinician. In some cases, referral to a pediatric cardiologist is required for further diagnostic work-up and, if necessary, treatment .[4]

Subjects and Methods:-

This study was conducted on 100 children suffering from bronchial asthma aged from 5-12 years who are

attendants of pediatric chest unit and pediatric asthma outpatient clinic in Benha university. Cross sectional study (Descriptive and comparative),It is carried out over 6 months from the beginning of October 2015 to the end of March 2016. All studied children subjected to the following; Through history taking, Careful physical examination and Routine investigations include; complete blood count, Renal and liver function tests. Chest x –ray, PEFR, Serum sodium &potassium level, Electrocardiogram(ECG) and Echocardiography.

Results:-

Table(1) shows sex distribution in 100 studied asthmatic children; 65% of studied asthmatic children are males while 35% are females.

Table 1:- Sex distribution among studied asthmatic children.

Sex		
	N	**%**
Male	65	65.00
Female	35	35.00
Total	100	100.00

Table(2) shows that : IACs are the most common drugs causing sinus tachycardia(20%) then corticosteroids (19%) while LABA are the least common drugs causing sinus tachycardia(6%) in our study and SABA are the most common drug used in asthma medications (80%) then IACs (79%) .

Table 2:- Asthma medications in studied asthmatic children with ECG findings.

Asthma medications	**ECG**						**Chi-Square**	
	Normal		**Arrhythmia(sinus tachycardia)**		**Total**			
	No	**%**	**No**	**%**	**No**	**%**	**X^2**	**P-value**
Leukotriene inhibitors	53	53.00	13	13.00	66	66.00	0.011	0.916
Corticosteroids	47	47.00	19	19.00	66	66.00	9.369	0.002*
SABA	66	66.00	14	14.00	80	80.00	1.563	0.211
LABA	14	14.00	6	6.00	20	20.00	1.563	0.211
IACs	59	59.00	20	20.00	79	79.00	6.646	0.010*

SABA: Short Acting Beta2 Agonist, LABA: Long Acting Beta2 Agonist, IACs: Inhaled AntiCholinergics.

Table (3) shows that 20% of studied asthmatic children have arrhythmia (sinus tachycardia) while 80% have normal ECG.

Table 3:- ECG in studied asthmatic children.

ECG		
	N	**%**
Normal	80	80.00
Arrhythmia (sinus tachycardia)	20	20.00
Total	100	100.00

Discussion:-

Bronchial asthma is one of the most chronic illnesses in children and recent years have seen a marked increase in its incidence.[5]

In the current study (table 1), males represented the majority of asthmatic children (65%) while females represented (35%), this in agreement with the results of Almqvist et al,[6] who reported that boys have more prevalent wheeze and asthma than girls. In adolescence, the pattern changes and onset of wheeze is more prevalent in females than males. Possible explanations for this switch around puberty in the gender susceptibility to develop asthma include hormonal changes and gender-specific differences in environmental exposures. This also in agreement with Bjornson and Mitchell,[7]

who demonstrated that Asthma is far more common in boys than girls during early childhood. The prevalence equalizes between the genders during adolescence and then switches to a female predominance in adulthood .

In our study, Short acting β2 agonists represent (80%) and inhaled anticholinergics (79%) are the most common medications used for asthma control in acute attacks as in our research acute asthma attack represent (90%) of studied asthmatic children, this agrees with NAEPP Expert [8] who reported that: Short-acting beta2-agonists are the treatment of choice for relieving symptoms during asthma attacks and for treating intermittent asthma symptoms. Also our study agrees with Bisgaard,[9] who said that; Inhaled short acting β2 agonist is the standard reliever medications for asthmatic children.

And our result agrees with GINA program,[10] who stated that a combined use of nebulized β2 agonist with ipratropium bromide produce better bronchodilatation and should be administered before methylxanthines are considered.

In our study we showed that, dyspnea was found in 35% of cases, palpitation in 24% which are common symptoms of cardiac manifestations in asthmatic children. while light headedness was the least common manifestation(3%), this agrees with NHLBI,[11] who reported that; short breath, palpitation and feeling light headedness are the most common symptoms in child with arrhythmia.

In our study we showed that; normal chest x.ray findings were the most common (57%) , increased broncho-vascular markings (peribronchial cuffing) were (42%) and pneumonic patches were the least common (10%), this result agrees with Lange S. Radiology of Chest Diseases,[12] who reported that; Plain chest radiographs can be normal in up to 75% of patients with asthma, reported features with asthma include; pulmonary hyperinflation, peribronchial cuffing (non specific finding but may be present in 48% of cases with asthma) and pulmonary edema (rare) .

In our study echocardiography showed 5% of studied asthmatic children with right ventricular dilatation but not measure function. Those 5% with right ventriclular dilatation accord asthma severity, 3% with severe persistent asthma and 2% with moderate persistent asthma. This result agrees with Pediatr Cardiol and Epub,[13] who reported that: Doppler echocardiographic study showed right ventricular dysfunction that is positively correlated with the severity of asthma.

In our study;(table 3) 20% of the studied asthmatic children have arrhythmia (sinus tachycardia) and it is the only type in our study, while 80% do not have arrhythmias, this result is in agreement with Doniger and sharieff [14] who reported that: The most common arrhythmia in children is sinus tachycardia.

In our study (table 2) shows that ; the most common drug causing arrhythmia is inhaled anticholinergic (IAC) and represent 20% causing sinus tachycardia with significant P-value (0.010) then corticosteroids 19% with significant P-value (0.002) then short acting β2 agonist (SABA) 14% then leukotriene inhibitors 13%, while least common drug causing arrhythmia is long acting β2 agonist (LABA) which represent 6%, this result agrees with Sruthi Adimadhyam et al.,[15] who reported that; risk of arrhythmia was associated with ipratropium bromide in children, adolescents, and young adults with asthma. Also our result agrees with American Thoracic Society,[16] who reported that :Inhaled anticholinergics (IACs) are associated with higher risk of arrhythmias in children and young adults and Active IAC use, characterized by having the drugs on hand, was associated with a 1.56-fold increase in arrhythmia risk compared with non-active users and non-users. Also use of inhaled anticholinergics (IACs) has been associated with an increased risk of potentially dangerous heart arrhythmias among young asthma patients, according to a study conducted by researchers at the University of Illinois at Chicago.

In our study we showed that; SABAs are the most common asthma medications 80%, from them 14% causing arrhythmia (sinus tachycardia), this result agrees with Taylor et al.,[17] who reported that: SABAs are the bronchodilators of choice in asthma. It has been shown that some people are more prone to experiencing the cardiovascular effects of β2-agonists compared with others due to a genetic polymorphism. Specifically, we were concerned that any effect observed with anticholinergics may be due to confounding by indication, where those patients using IACs were at highest risk. This may be particularly true among patients switched to an IAC because they may have experienced cardiovascular adverse effects from their SABA.

Conclusion:-

Risk of arrhythmia in asthmatic children from 5-12 years old in acute exacerbation or in between attacks, males with bronchial asthma represent the majority of asthmatic children, short acting β2 agonists(SABA) and inhaled

anticholinergics(IACs) are the most common asthma medications used for asthma control in acute attacks, 20% of studied asthmatic children have sinus tachycardia, there was significant positive relation between asthma medications and arrhythmia in asthmatic children and there was significant association between asthma exacerbation and arrhythmia in asthmatic children.

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