THE GROWTH AND ASTHMA IN CLILDREN

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summary:

The growth of one hundred fifty children with asthma aged 1-12 years and a comparable number of control group with the same age group and sex where studied in term of height and weight centile and skin fold thickness at Saddam Central Teaching Hospital for Children for the period between the 1st Nov. 2007- 31st March 2008 in Baghdad, taking in consideration the residency and the socio-economic status According to the frequency of the attacks of asthma, presence of symptoms between the attacks, the treatment received between the attacks and the duration of the disease. The patients were divided into three groups of mild, moderate and severe asthma excluding the patients who were on steroid therapy. The results showed that males were affected more than females (62%, 38% respectively). The presentation were more in the first four years of life (55%) . All the anthropometric measurements of the height, weight and skin fold thickness were significantly retarded in the asthmatic (P= 0.032). The more severe the disease and the longer the duration of the disease the more the retardation is in the height and weight (P=0.01) but the diminution in skin fold thickness was present with the severity rather than the duration of the disease which was affected earlier in the disease. Growth retardation in asthma need to be detected earlier and might be prevented if asthma had been properly managed.

Introduction:

Asthma is the commonest chronic respiratory disorder in children, and may cause considerable disability throughout childhood. It is defined as hyper-reactivity of airways to a variety of stimuli and a high degree of

reversibility of obstructive process, which may occur either spontaneously or as a result of treatment [1,2].

At some stage of childhood 20% of individuals wheeze as a result of asthma. It account for 10% of medical emergency room visits, and 10% of medical hospitalization. About 1 in 40 asthmatic children has serious airway obstruction which may persist for several months or occasionally years [3,4].

Asthma may have its onset at any age, 30% of patients are symptomatic by one year of age, whereas 80-90% have their first symptoms before 4-5 years of age.

As many as 10-15% of boys and 7-10% of girls may have asthma at some time during childhood. Before puberty approximately twice as many boys as girls are affected, because during adolescence, girls show less improvement than boys, so that by early adult life the sex difference no longer exist [1,3].

Approximately 70% of asthmatic children appear to be outgrow their asthma by the age of 12 year and many of the remaining 30% improve. The progress depend on severity of asthma, positive family history of allergy and the duration of the disorder before the start of the treatment. The greater the severity. The longer the duration of symptom and allergic the family, the poorer is the prognosis for cure.

Factors associated with poor prognosis or death from asthma include, delayed in seeking medical attention, underestimation of the severity of the episode by patient, parents and physician, sedation, under use of bronchodilator and corticosteroid, frequent and severe symptoms, especially in early morning, frequent hospitalization, dependence on oral steroid, living in chaotic, unsupportive or disturbed family, delay in implementation of appropriate treatment and black race [1,2,5,8].

Growth and asthma

Acknowledge of normal growth of children is essential for preventing and detecting diseases by recognizing overt deviations from normal patterns. Although the processes of growth and development are not completely separable, it is convenient to refer to "growth" as the increase in the size of the body as a whole or the increase in his separate parts and to reserve the development for changes in function, including those influenced by the emotional and social environment [20].

Deviations in growth patterns are nonspecific but very important indicator for serious medical disorder. They often provide the first clue that something is wrong,, occasion-ally even when the parents don't suspect a problem. An accurate measurement of the height and weight should be obtained at every health supervision visit [20.[

Although recent interest in the growth of asthmatic children has centered on growth failure as potential side effect of corticosteroid treatment, it is has long been recognized that asthma itself can impair the growth. It is now over a hundred years (1868) since Hyde satire, describing the appearance of the asthmatic patients, comment that if the asthma has come on young, be is generally below the average height. Some asthmatic however have nothing whatever the matter with their appearance, and will be taken for perfectly healthy people [11,19.[

The height being un affected in milder cases but with increasing severity of the allergic disease, there was impaired growth and finally delayed sexual maturation. There is association between uncontrolled asthma with growth impairment and found that the satisfactory control of allergic disease was associated with improved energy intake as well as satisfactory growth [11.[

Asthma and perhaps allergy in general is associated with delayed maturation, and hence with prolongation and Deeping of the prepubertal growth such an effect would not be expected to have any great influence on final adult height [11 .[

It is tempting to speculate that asthmatic children who commonly suffer from night time symptoms with consequent sleep disturbance, might have impaired nocturnal growth hormone secretion but administration of growth hormone has no effect on the growth of asthma children, although has yet to be evaluated in under growth asthmatic children who have not had corticosteroid treatment [11].

Aim of the study:

This study was conducted to assess the growth including weight, height and skin fold thickness in asthmatic patients and to evaluate the role of different important factors affecting the growth in asthmatic patients

PATIENTS AND METHOD

One hundred fifty patients known case of asthma aged between 1-12 years with acute asthmatic attack of those asthmatic patients admitted to the casualty unit Child Central Teaching Hospital for Children in Baghdad city during the period from first November 2007 to 31st March 2008.Another one handed fifty healthy children matched for age, sex , socioeconomic state and residency, without any history of medical problem or chronic disease. Those children studied as control group.

The patient should have the following criteria to be selected in the study-:
1-Age between 1-12 years .
2-Should have more than one attack of air way obstruction which were reversible.
3-Should not be on steroid therapy.
The information on each patient were selected using a well-structured questionnaire (Appendix I) form which include name, age, sex, residence, socioeconomic state, duration of asthma, frequency (no., of attack /year), presence of symptoms in between the attacks, hospitalizations number and treatment received at home in between the attacks. Then for each patient weight, height and skin fold thickness were measured . The information on each child in the control group include the age, sex, residency and socioeconomic state, then height, weight and skin fold thickness were measured.

The length of children aged between one -two years was measured by supine length (England made, min. 23.5 cm - max. 113 cm). The length require two person to carry out the manovour the baby head is held with occiput in back plate and the crown of head touching the base plate. One leg is extended and the movable foot plate brought up to make contact with sole of babies food which be at right angle to the lower leg [12.[

The height of children aged between two- twelve year was measured by standing in bare feet with back against the measuring scale and the head held in the frankfurter plane with gentle upwards pressure on the mastoid by using siadiometer (Seca, Germany made, min. 75 cm. max. 200 cm) [12].

the skin fold of children taken in study was measured by picking up a fold of skin and fat of triceps between the thumb and forefinger and measuring

it is thickness with special, constant pressure caliper called Harpeden caliper (England made, measure 0-34 mm) [17].

The weight of children was measured by Seca weight scale for infant (Germany made, min. 0.5 Kg, max. 16 Kg) for those children aged between one and two years and by bath room scale for weight for those aged greater than two years.

The results were compared with normal values on growth charts for children (National Center for Health Statistics Percentile "NCHS") [1].

According to frequency of attack, presence of symptoms in between the attacks hospitalization number and need of treatment in between the attacks, the patients divided to mild, moderate and severe asthma [1.[

1-Mild asthma: the frequency of attacks is variable, up to twice each week, response to bronchodilator within 24-48 hours free of symptoms in between the attack, not require treatment in between the attacks.

2-Moderate asthma : the attack more frequent, there is symptoms in between the attacks, mostly cough and wheezing, require treatment in between the attacks.

3-Severe asthma : there is daily wheezing, more frequent and severe attacks, they require recurrent hospitalization, which is rarely required for mild or moderate asthma treatment needed continuously.

RESULTS

1-WEIGHT:

The weight of both patients and controls are affected but the asthmatic are affected more than the control. There is only 28% of patients he within the mean (50* percentile) and 50% are below the mean and only 22% above the mean. Regarding the control, 44% he within the mean, 28% below the mean and 28% above the mean, as shown in table 1.

Table 1: The weight percentile of patients and controls *.

Weight Percentile	patients No.	Control No.
> 95th	-	2%
95th	2%	2%
90th	6%	4%
75th	14%	20%
50th	28%	44%
25th	14%	10%
10th	14%	6%
5th	10%	4%
<5th	12%	8%

2- HEIGHT

• X2= 0.96, d.f. = 2, P=0.618 (NS)

The height for both patients and control are affected but the height for patients are more affected, where only 24% of patients he within the mean, while 58% are below the mean, and only 18% above the mean for the control group, 40% within the mean. 30% above the mean and 30% below the mean as shown in table 2.Also these results shows that the height are more affected than weight..

Table 2: The percentage of the height and length percentile of the patients and controls

Height & length	patients	Control
Percentile	No.	No.
> 95th	-	4%
95th	2%	6%
90th	4%	10%
75th	12%	10%
50th	24%	40%
25th	16%	8%
10th	12%	12%
5th	12%	6%
<5th	18%	4%

• X2= 6.92, d.f. - 2, P=0.032 (S)

3-SKIN FOLD THICKNESS:

The study shows that the skin fold thickness for both patients and controls was affected but the patients were affected more than the controls. The control skin fold thickness range from 73-85% of the standard chart while the patients range from 60-75% of standard chart. This is applicable for all age groups and for both males and females. (Tab. 3).

Table 3: The skin fold thickness of the patients and controls by age and sex with the standard skin fold thickness.

Age group	Standard		Control		Patients	
	SFT	%	SFT	%	SFT	%
1-4 Male	10.25	100	8.7	85	7.75	75
Female	11.25	100	9.25	83	8	71
5-8 Male	8	100	6.5	81	5.25	65
Female	9.7	100	7.5	80	6.5	67
9-12 Male	7	100	4.75	73.3	4	60
Female "	8.25	100	6.25	75	5.5	65

4-WEIGHT WITH DURATION OF ASTHMA:

The weight had a strong relationship with the duration of the disease where about 20% of those with 2 years duration are weight retarded. But there is about 50% of those with 4 years are weight retarded. While for those with 5 years or more duration the retardation percentage was $5%. So the duration of the disease is directly related to the degree of retardation of weight (Tab. 4)

Table 4: The relation between the duration of the disease and weight of patients in percentile *. _____

	DURATION OF THE DISEASE						
Weight Percentile	1 year	2 years	3 years	4 years	5 & more	Total No.	%
> 95th	-	-		-	_	-	_
95th	2	1	-	_	-	3	2
90th	4	4	1	_	-	9	6
75th	12	4	3	_	2	21	14
50th	16	10	6	4	6	42	28
25th	7	8	1	1	4	21	14
10th	5	5	3	2	6	21	14
5th	1	2	2	2	8	15	10
<5th	1	. 2	2	3	10	18	12
Total	48	36	18	12	36	150	100%

' X2 = 5.38, d.f. = 4, P=0.178 (NS)

5- HEIGHT WITH DURATION OF ASTHMA:

The study results show that about 15% of those with 2 years duration are i height retarded, while about 60% were height retarded of those with 4 years duration. On other side those children with 5 years or more duration 90% are retarded in height. So more prolong the duration of the disease lead to more height retardation (Tab. 5)

Table 5: The relation between the duration of the disease and Height of patients in percentile *.

	DURATION OF THE DISEASE						
Height Percentile	1 year	2 years	3 years	4 years	5 & more	Total No.	%
> 95th	-	-	-	-	-	-	-
95th	2	1	-	-	-	3	2
90th	4	1	1	-	-	6	4
75th	10	5	2	1	-	18	12
50th	18	10	4	2	2	36	24
25th	8	12	1	1	2	24	16
10th	5	3	4	-	6	18	12
5th	1	2	3	2	10	18	12
< th	-	2	3	6	16	27	18
Total	48	36	18	12	36	150	100%

* X2= 9.29, d.f. = 4, P=0.01 (S)

6-WEIGHT WITH SEVERITY OF ASTHMA:

About 18% of patients with mild asthma had weight retardation, while about 50% of those with moderate asthma the weight was retarded. Those children with severe asthma the weight retardation was 66%. From these findings one can exclude the direct relationship between the weight and severity of the disease. (Tab.6).

table 6. The relation between weight percentile and the severity of the disease *

Weight percentile	Mild	Moderate	Severe	Total	%
>95th	-	-	-	-	-
95th	2	1	-	3	2
90th	6	3	-	9	6
75th	16	4	1	21	14
50th	30	10	2	42	28
25th	11	8	2	21	14
loth	8	11	2	21	14
5th	4	8	3	15	10
<5th	3.	10	5	18	12
total	80	55	15	150	100%

>X2= 2.23, d.f. = 4, P=0.328 (NS)

7-HEIGHT WITH SEVERITY OF ASTHMA:

I The results show that 20% of mild cases had height retardation, while 56% of those with moderate disease had height retardation on other side those with severe ^disease, there was 80% of them were height retarded. So there is strong relationship between the severity and the degree of height retardation. (Tab. 7)

Table7: The relation between height percentile and the severity of the disease *.

{Height ^percentile	Mild	Moderate	Severe	Total	%
>95th	-	-	-	-	-
95th	3	-	-	3	2
90th	5	1	-	6	4
75th	12	6	-	18	12
50th	24	11	1	36	24
25th	16	6	2	24	16
10th	10	6	2	18	12
5th	6	9	3	18	12
<5th	4	16	7	27	18
Total	80	55	15	150	100%

• X2= 3.44, d.f. = 4, P=0.179 (NS)

DISCUSSION:

In majority of those one hundred fifty patients, asthma occur in first four years of life, this result was in consistent with other studies done by Ali .JA. 1995 and Zaid K. Al-Hummady 1997 [13,14].

Male were more predominant in this study. This result was similar to other ies done by Eosin.R.R 1990, Yasigi, 1993 and Said. JA. Al-Hummady [14-16].

The socioeconomic state for patients and controls had no significant ierence. The study show that fathers were educated more than the mothers ority of mothers were house wife's and minority were work outside the home is because of cultural back ground. Three quarter of fathers having a job, either government or free job while one quarter were unemployed and our observation that, the children of unemployed fathers usually having moderate or severe This may be due to poverty and the unavailability of good environment for children.

About more than half of patients having mild asthma, while one third having moderate asthma and only 10% of patients having severe asthma. This result was in agreement with other study done by Zaid K. AL Hummady 1997 [14].

The height, weight and skin fold of the children which taken as control group were affected but less than asthmatic patients. This is mainly due to the effect of the blockade on our country.

The height was affected more than the weight where 58% of patients had leight below the mean. While 50% of patient had weight below the mean .

The retardation in height (5^{th} percentile and less than 5^{th} percentile) was 30% of patient. While retardation in weight (5^{th} percentile and less than 5^{th} percentile) was 22% of patients. These result was similar to the study done by Zaid K. Al-Hummady [14].

The severity of the disease play an important role in the growth. The more severe the asthma, even with short duration, had an effect on the weight and height These result were similar to the study done by George Russell 1993 [11].

Similarly the skin fold thickness of the patients were affected and found to be related to the severity of the disease rather than to the duration**.**

The chronicity of the disease was directly related to the severity of the asthma to the degree of the height and weight retardation. The more chronic the disease the more severe and more weight and height retarded

CONCLUSION:

From the study we can conclude that asthma has an affect on the growth in all parameters (weight, height and skin fold thickness) and the growth has significant relation with the duration and the severity of the disease Thus the growth retardation can be used as a very useful index in the assessment of the severity of asthma.

RECOMMENDATION:

1-Education and explanation to the family the nature of the disease, progression, therapy and other aspects of the disease like preventive measures,

2-Early recognition of the severity of the disease by physicians to give proper 1 therapy.

3-Follow up of the patients as any chronic disease and during their visit serial measurements of the growth parameters done and then we can give useful instructions for improvement of the growth.

4-Good calorie intake must be encouraged to asthmatic patients because good nutritional state is very important to catch-up the normal growth and to decrease the severity of the growth retardation

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