THE USE OF LINEAR GROWTH PARAMETERS IN ASSESSING THE EFFECTS OF INHALED CORTICOTHERAPY UPON THE GROWTH RATE

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Keywords: *asthma, inhaled corticosteroids, anthropometry*

Abstract: *The use of inhaled corticosteroids in the long-term treatment in children with mild or moderate asthma may influence their growth and development. The aim of the study is to assess the way in which the use of inhaled corticosteroids in low doses in children with asthma influences their growth rate. The study was developed on a period of two years measuring a number of eight anthropometric parameters every six months. The data obtained do not indicate a significant decrease in the growth rate of the studied cases.*

Cuvinte cheie: *astm bronşic, corticosteroizi inhalatori, antropometrie*

Rezumat: *Corticoterapia inhalatorie în tratamentul de lungă durată la copiii cu astm bronşic forma uşoară sau medie poate influenţa creşterea şi dezvoltarea acestora. Scopul studiului este cercetarea modului în care utilizarea corticosteroizilor inhalatori în doze mici la copiii cu astm bronşic influenţează rata de creştere a acestora. Studiul a fost efectuat pe o perioadă de doi ani, evaluând un număr de opt parametri antropometrici, la intervale de şase luni. Datele obţinute nu evidenţiază o scădere semnificativă a ratei de creştere la cazurile studiate.*

INTRODUCTION

In addition to the multiple roles anthropometry has, one very important is its use in assessing how inhaled corticosteroids (ICS) affect the growth and the development of children with asthma.

Anthropometry is the best way to highlight the changes that may occur during the growth and development of the human body.

ICS are the first-line treatment for the patients with persistent asthma; they are the only currently available therapy that suppress airway inflammation by inhibiting almost every aspect of the inflammatory process in asthma. Inhaled corticosteroids are effective in most patients with asthma, regardless of age or disease severity (1), they are indispensable in the treatment of asthma.(2) Inhaled corticosteroids began to be used more frequently to treat asthma since asthma was labelled as a chronic inflammatory disease. ICS offer a wide range of inflammatory activity and have consistently shown that they are the most effective medicine to control asthma in childhood.(3,4,5)

Low doses of ICS have an effect comparable to the moderate doses, our study including patients who used these low-dose of ICS (Becotide 200-400µg/day or Fluticasone 100-300µg/day). Most clinicians favour the use of low doses of ICS as to decrease the chances of causing adverse effects (6), other researchers indicate, that in cases where ICS doses are not sufficient to associate them with beta2-agonists.(7) There are opinions that emphasize that the use of ICS in acute asthma crises has a lower systemic corticosteroid administration.(8)

Like the corticosteroids administered orally, the inhaled ones may have adverse effects on long-term treatments, among which we mention the decrease of the growth and development rate (9), on which we focused this study. In connection with this undesired effect of ICS, opinions are divided; some studies show that ICS reduce the growth in children with asthma (10), but on the contrary, others believe that ICS have a negative influence on growth.(11)

Another group of researchers shows that ICS should not be used routinely to treat acute exacerbations of asthma (12), while others believe that the treatment with only one inhaled corticosteroid is not sufficient to control asthma and affirm that it is necessary to associate beta2-agonists on long-term therapy.(13)

The cornerstone in controlling asthma is the ICS, a control that can be influenced by many factors, both behavioural and related to treatment outcome depending on how patients and caregivers cooperate in properly administering and following the treatment.(14) One of the advantages of using ICS is that their effect is very fast and prompt.(15)

PURPOSE

The aim of the study is to assess how the low-dose inhaled corticosteroid use in children with asthma affects their growth rate.

METHODS

There were 200 subjects, divided into 2 groups: group A consisted of 100 children with a diagnosis of asthma in a mild or moderate form, treated with inhaled corticosteroids and control group B consisted of 100 children who did not have any chronic disease. The subjects were divided into 5 age groups: 1) 5 years old - 8 years old 2) 8 years old - 10 years old 3) 10 years old - 13 years old 4) 13 years old - 16 years old 5) 16 years old - 19 years old. The groups were homogeneous with no significant differences in sex ratio and distribution by age groups. For each age group of subjects in groups A and B, measurements of the following anthropometric parameters were performed every six months: height, leg length and the length of the plant. The measurements were performed over a period of two years. The inclusion criteria in both groups were:

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Article received on 14.01.2013 and accepted for publication on 05.04.2013
ACTA MEDICA TRANSILVANICA June 2013;2(2):264-266

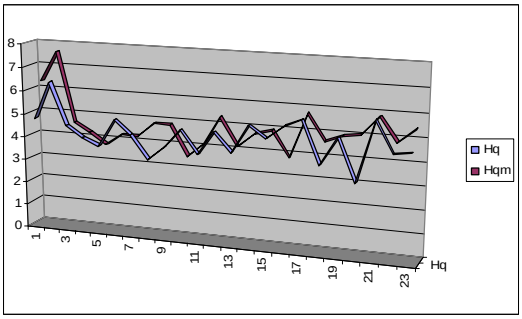
- children aged 5 years old - 19 years old;
- children registered with asthma and treated with inhaled corticosteroids (group A);
- children who are not registered with chronic heart, lung, kidney or abnormal hematopoiesis (group B).

RESULTS AND DISCUSSIONS

1. Height

In the age group of 5 years old - 8 years old, there was a decrease in growth in the subjects treated with ICS: about 1 mm after the first year, after the second year of treatment, the difference was less than 1 mm, p was 0.96.

Figure no. 1. Comparison of height growth values after two years (age group 5 years old - 8 years old). Hq - study group, Hqm - control group



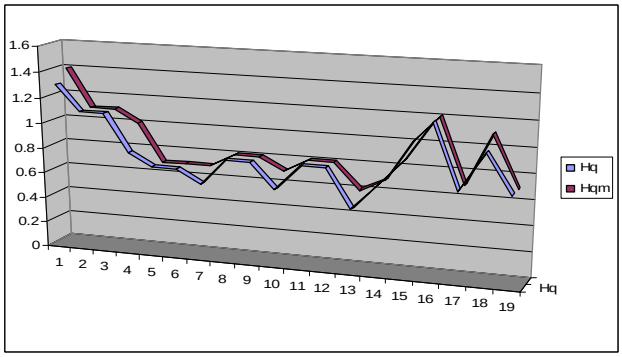
In the age group of 8 years old - 10 years old, there has been a decline in the growth rate of about 0.6 mm after the first year, after the second year of treatment, the difference was less than 0.3 mm, p was 0.92.

In the age group of 10 years old - 13 years old, there has been a growth rate approximately equal to the first year of treatment, after the second, the difference was less than 0.8 mm, p was 0.93.

In the age group of 13 years old - 16 years old, there has been a growth rate approximately equal to the first year of treatment, after the second, the difference was less than 0.3 mm, p was 0.99.

In the age group of 16 years old - 19 years old, there has been a growth rate approximately equal to the first year of treatment, after the second, the difference was less than 0.4 mm, p was 0.95.

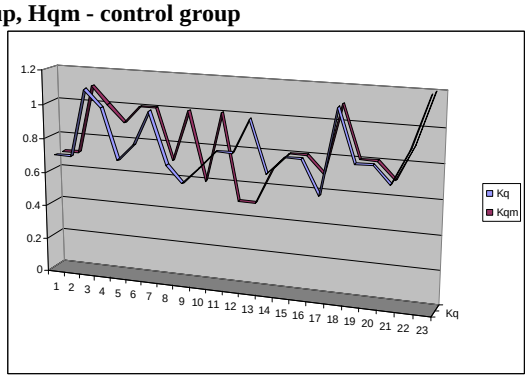
Figure no. 2. Comparison of height growth values after two years (age group 16 years old - 19 years old). Hq - study group, Hqm - control group



2. Calf length

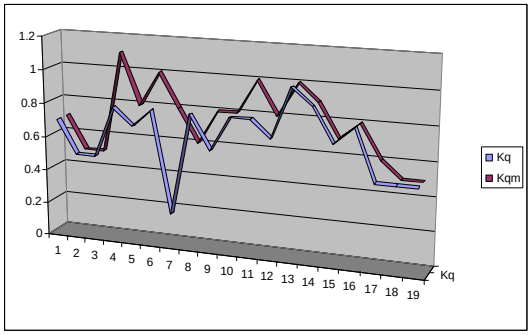
In the age group of 5 years old - 8 years old, there has been a decrease in the growth rate by about 0.3 mm after the first year, after the second year of treatment, the difference was less than 0.1 mm, where p was 0.97.

Figure no. 3. Comparison of values of height growth after two years (age group 5 years old - 8 years old). Hq - study group, Hqm - control group



In the age group of 8 years old - 10 years old, there was a minimal decrease in growth by about 0.2 mm after the first year, after the second year, the difference was less than 0.3 mm, where p was 0.93. In the age group of 10 years old - 13 years old, there was a minimal decrease in growth by about 0.1 mm after the first year, after the second, the difference was less than 0.1 mm, where p was 0.97. In the age group of 13 years old - 16 years old, there was a minimal decrease in growth by about 0.4 mm after the first year, after the second, the difference was less than 0.1 mm, where p was 0.93. In the age group of 16 years old - 19 years old, there was a minimal decrease in growth by about 0.4 mm after the first year, after the second, the difference was less than 0.1 mm, where p was 0.86.

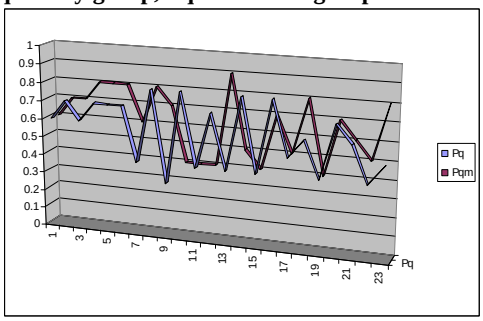
Figure no. 4. Comparison of calf length values increase after two years (age group 16 years old - 19 years). Kq - study group, Kqm - control group



3. Plant length

In the age group of 5 years old - 8 years old, there was a minimal decrease in growth by about 0.3 cm after the first year, after the second year of treatment, the difference was less than 0.6 cm, where p was 0.9.

Figure no. 5. Comparison of values of increasing the length of the plant after two years (age group 5 years old - 8 years old). Pq - study group, Pqm - control group



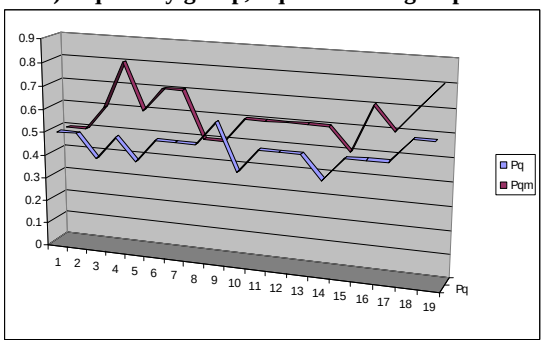
In the age group of 8 years old - 10 years old, there was a minimal decrease in growth by about 0.1 cm after the first year, after the second, the difference was less than 0.2 cm, where p was 0.92.

In the age group of 10 years old - 13 years old, there was a minimal decrease in growth by about 0.1 cm after the first year, after the second year of treatment, the difference was less than 0.1 cm, where p was 1.00.

In the age group of 13 years old - 16 years old, there was a minimal decrease in growth by about 0.2 cm after the first year, after the second, the difference was less than 0.4 cm, where p was 0.9.

In the age group of 16 years old - 19 years old, there was a minimal decrease in growth by about 0.4 cm after the first year, after the second the difference was less than 0.3 cm, where p was 0.85.

Figure no. 6. Comparison of values of increasing the length of the plant after two years (age group 16 years old - 19 years old). Pq - study group, Pqm - control group



CONCLUSIONS

Of the values obtained, there was a discrete decrease in the growth rate in the subjects treated with ICS, compared with those of the control group, the difference in growth was less than 1 mm for both the first year of treatment and after the second, p being higher than 0.85.

The influence of leg growth rate in the subjects treated with ICS is not statistically significant.

The average leg length difference in the subjects treated with ICS, compared with those of the control group was lower by 0.5 mm at most, both at one year and two years after the treatment, with p higher than 0.86.

Plant growth in the subjects treated with ICS is statistically insignificant.

In the case of plant length, the growth was lower in the subjects treated with ICS compared with the control group, with values up to 0.4 mm after one year and by 0.6 mm after two years of treatment, with p higher than 0.85.

Inhaled corticosteroids do not affect plant length growth.

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