

THE ROLE OF ANTHROPOMETRY IN THE DEVELOPMENT OF ASTHMATIC CHILDREN

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Abstract: The use of as many anthropometric landmarks in assessing the growth and development rate in asthmatic children leads us to obtain conclusive results on how inhaled corticosteroids may affect their development. The study aimed at using as many anthropometric parameters in order to obtain the highest accuracy in studying the influence of inhaled corticosteroid therapy administered on long term in the children with asthma. The study included two hundred subjects divided into two groups and five age groups. The measurements were performed every six months for a period of two years. The values obtained did not show a significant rate of growth and development in the subjects receiving low-dose inhaled corticosteroids over a period of two years.

Cuvinte cheie: antropometrie, astm bronșic, corticosteroizi inhalatori

Rezumat: Utilizarea a cât mai multor repere antropometrice în evaluarea creșterii și dezvoltării copiilor astmatici ne conduc spre obținerea unor rezultate concludente referitoare la felul în care corticosteroizii inhalatori pot influența dezvoltarea acestora. Studiul a avut ca scop utilizarea mai multor parametri antropometrici pentru o acuratețe cât mai mare în studierea influenței corticoterapiei inhalatorii administrată pe termen lung la copiii cu astm bronșic. În studiu au fost cuprinși două sute de subiecți, împărțiți în două loturi și în cinci categorii de vârstă. Măsurătorile s-au efectuat la interval de șase luni, timp de doi ani. Valorile obținute nu au evidențiat o influență semnificativă a ratei creșterii și dezvoltării subiecților cărora li s-a administrat corticoterapie inhalatorie, în doze mici, pe o perioadă de doi ani.

INTRODUCTION

For an accurate assessment of growth and development of our human body, it is useful to evaluate as many anthropometric landmarks from different parts of the body.(1)

For an accurate assessment of growth in asthmatic children treated with inhaled corticosteroids, we considered useful the measurement of eight benchmarks, both for longitudinal measurements and circumferences, all the data obtained leading us to an accurate result.

We believe that the chosen markers play an important part in the accurate assessment of the factors that can influence the growth and development of asthmatic children.

Studies so far have considered one, maximum two anthropometric indices to investigate the possible influence of inhaled corticosteroid therapy on the growth and development of asthmatic children.

The "cornerstone" in asthma control is represented by inhaled corticosteroids, a control that can be influenced by many factors, both behavioural and related to treatment, the outcome depending on how patients and caregivers cooperate correctly in following a given treatment.(2) One of the advantages of using CIS is that their effect is very fast and prompt.(3)

Inhaled corticosteroids (CSI), like most corticosteroids may have adverse effects on long-term treatment, among which decreased growth and development (4), on which we focused our study. Regarding the adverse effects of CIS, opinions are divided, some studies show that CIS decrease the growth rate in children with asthma (5), but on the contrary, others believe that CIS do not have a negative influence on growth.(6)

First line therapy for patients with persistent asthma is represented by CIS; they are the only therapy currently available that suppresses airway inflammation in asthmatic patients, 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 (7), they are indispensable in the treatment of asthma.(8) Under current guidelines, inhaled corticosteroids are preferred as first-line treatment of long-term asthmatic children in all age groups (9), they represent the backbone of treatment (10,11), CSI being the "gold standard" therapy in anti-inflammatory asthma.(12) CSI offer a wide range of inflammatory activity and have consistently shown that they are the most effective medicine to control asthma in childhood.(9,13,14)

In practice, we use CIS in low doses that have an effect comparable to moderate doses (15); our study included patients using this low-dose of CSI (Becotide 200-400µg/day or Fluticasone 100-300µg/day). Many clinicians' opinion is to use low doses of CIS as to decrease the chances of facing their adverse effects.(16)

PURPOSE

The study aimed at using as many anthropometric parameters in order to obtain the highest accuracy in studying the influence of inhaled corticosteroid therapy administered on long term in the children with asthma.

METHODS

This study consisted of two hundred subjects: one hundred children with mild or moderate asthma undergoing

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treatment with low doses of CIS, and one hundred represented the control group, children who did not have any chronic disease and showed no growth disorders. The subjects were divided into five age groups: 5 years old - 8 years old, 8 years old - 10 years old, 10 years old - 13 years old, 13 years old - 16 years old and 16 years old - 19 years old. For each age group, both the witness subjects and those with asthma, measurements of the following anthropometric parameters were performed every six months for two years: height, leg length and length of the plant.

RESULTS AND DISCUSSIONS

The linear growth parameters are height, leg length, length of the plant.

The circumference growth parameters are skull, chest, arm, thigh, calf.

Height

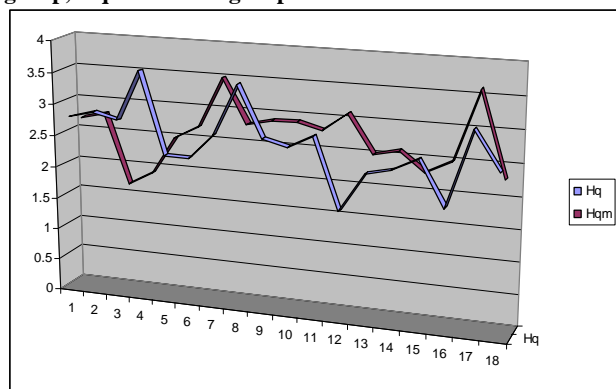
In the age group of 5 years old - eight years old, there was a decrease in growth in the subjects treated with CSI: about 1 mm after the first year of treatment, after the second year, the difference was less than 1 mm, p was of 0.96.

In the age group of 8 years old - 10 years old, there has been a decline in growth of about 0.6 mm after the first year of treatment, after the second, 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.

Figure no. 1. Comparison of height growth values after two years (age group 13 years old - 16 years old). Hq - study group, Hqm - control group



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.

Leg length

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

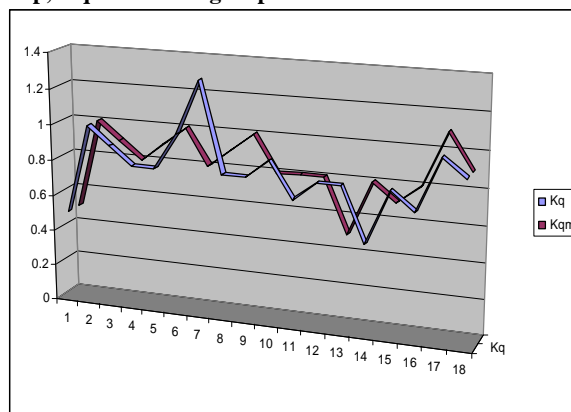
In the age group of 8 years old - 10 years old, there was a minimal decrease in growth by about 0.2 mm after the first year of treatment, after the second, the difference was less than 0.3 mm, where p was 0.93.

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 of treatment, after the second year of treatment, 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 of treatment, after the second year, the difference was less than 0.1 mm, where p was 0.93.

Figure no. 2. Comparison of leg length increase values after two years (age group 13 years old - 16 years old). Kq - study group, Kqm - control group



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 of treatment, after the second, the difference was less than 0.1 mm, where p was 0.86.

Plant length

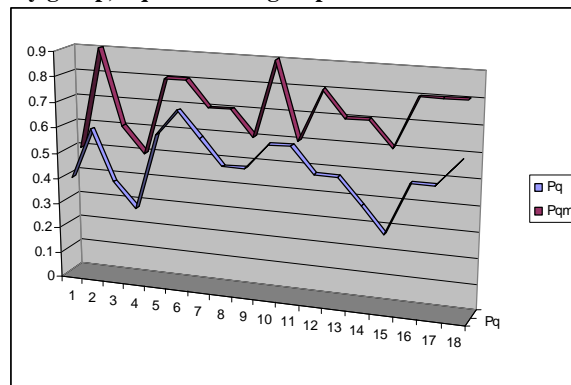
In the age group of 5 years old - 8 years old, there was a minimal decrease in growth by about 0.3 cm after the first year of treatment, after the second, the difference was less than 0.6 cm, where p was 0.9.

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 of treatment, 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 of treatment, after the second, 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.

Figure no. 3 Comparison of plant length increase values after two years (age group 13 years old - 16 years old). Pq - study group, Pqm - control group



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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.

Skull circumference

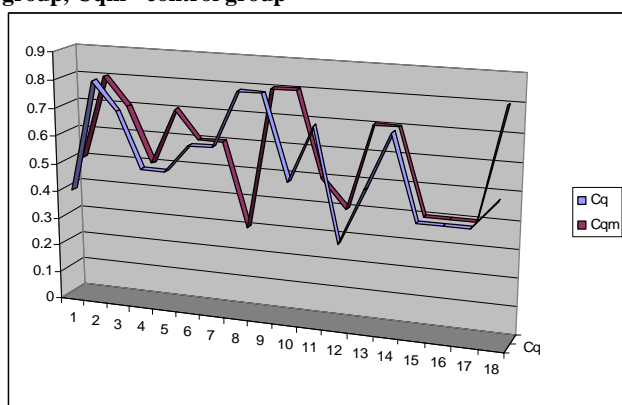
In the age group of 5 years old - 8 years old, there was a minimal decrease in growth by about 0.1 cm after the first year, after the second, the difference was less than 0.2 cm, where p was 0.96.

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 0.3 cm, where p was 0.94.

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, the difference was less than 0.4 cm, where p was 0.91.

In the age group of 13 years old - 16 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 0.96.

Figure no. 4 Comparison of skull circumference growth values (age group 13 years old - 16 years old). Cq - study group, Cqm - control group



In the age group of 16 years old - 19 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 0.2 cm, where p was 93.

Chest circumference

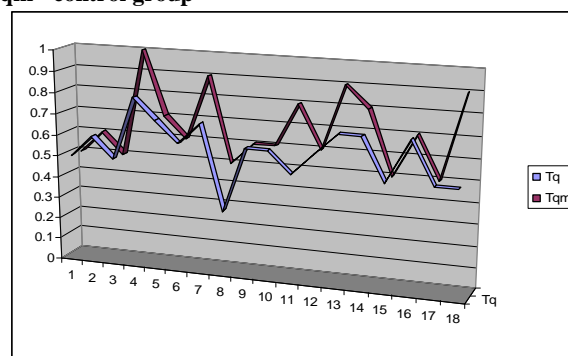
In the age group of 5 years old - 8 years old, there was a minimal decrease in growth by about 0.03 cm after the first year, after the second, the difference was less than 0.04 cm, where p was 0.91.

In the age group of 8 years old - 10 years old, there was a minimal decrease in growth by about 0.01 cm after the first year, after the second, the difference was less than 0.01 cm, where p was 0.97.

In the age group of 10 years old - 13 years old, there was a minimal decrease in growth by about 0.03 cm after the first year, after the second, the difference was less than 0.02 cm, where p was 0.94.

In the age group of 13 years old - 16 years old, there was a minimal decrease in growth by about 0.01 cm after the first year, after the second, the difference was less than 0.02 cm, where p was 0.96.

Figure no. 5. Comparison of chest circumference increase values (age group 13 old -16 years old). Tq - study group, Tqm - control group



In the age group of 16 years old - 19 years old, there was a minimal decrease in growth by about 0.02 cm after the first year of treatment, after the second, the difference was less than 0.01 cm, where p was 0.96.

Arm circumference

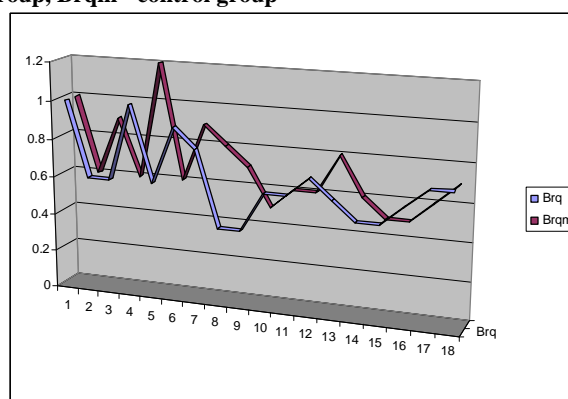
In the age group of 5 years old - 8 years old, there was a minimal decrease in growth by about 0.2 mm after the first year, after the second, the difference was less than 0.3 mm, where p was 0.93.

In the age group of 8 years old - 10 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 0.4 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 0.4 mm, where p was 0.92.

In the age group of 13 years old - 16 years old, there was a minimal decrease in growth by about 0.2 mm after the first year of treatment, after the second the difference was less than 0.3 mm, where p was 0.92

Figure no. 6. Comparison of arm circumference increase values (age group 13 years old - 16 years old). Brq - study group, Brqm - control group



In the age group of 16 years old - 19 years old, there was a minimal decrease in growth by about 0.3 mm after the first year, after the second, the difference was less than 0.6 mm, where p was 0.85.

Thigh circumference

In the age group OF 5 old - 8 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 0.04 cm, where p was 0.87.

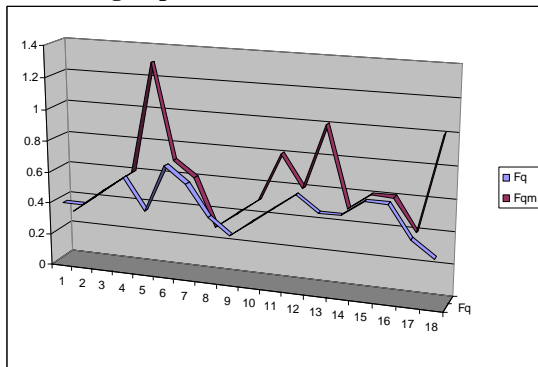
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In the age group of 8 years old - 10 years old, there was a minimal decrease in growth by about 0.01 cm after the first year of treatment, after the second, the difference was less than 0.01 cm, where p was 0.98.

In the age group of 10 years old - 13 years old, there was a minimal decrease in growth by about 0.04 cm after the first year of treatment, after the second, the difference was less than 0.06 cm, where p was 0.84.

In the age group of 13 years old - 16 years old, there was a minimal decrease in growth by about 0.04 cm after the first year, after the second, the difference was less than 0.05 cm, where p was 0.89.

Figure no. 7. Comparison of thigh circumference increase values (age group 13 old -16 years old). Fq - study group, Fqm - control group



In the age group of 16 years old - 19 years old, there was a minimal decrease in growth by about 0.03 cm after the first year, after the second, the difference was less than 0.04 cm, where p was 0.88.

Calf circumference

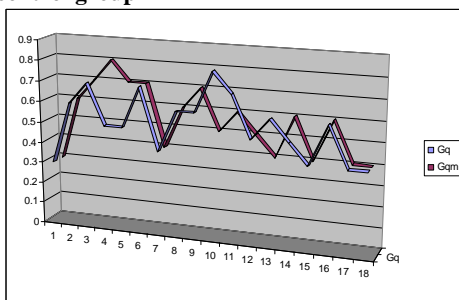
In the age group of 5 years old - 8 years old, by examining the values obtained, I noticed a decrease in growth by about 0.2 mm after the first year of treatment, after the second, the difference was less than 0.2 mm where p was 0.94.

In the age group of 8 years old - 10 years old, by examining the values obtained, I noticed a minimal decrease in growth by about 0.2 mm after the first year of treatment, after the second, the difference was less than 0.3 mm 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 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 0.1 mm after the first year, after the second year of treatment, the difference was less than 0.4 mm where p was 0.92.

Figure no. 8. Comparison values increase calf circumference (age group 13 years old -16 years old). Gq - study group, Gqm - control group



In the age group of 6 years old - 19 years old, by examining the values obtained, I noticed a minimal decrease in growth by about 0.3 mm after the first year of treatment, after the second, the difference was less than 0.5 mm, where p was 0.86.

CONCLUSIONS

By examining the values obtained, there was a slight decrease in the growth rate in the subjects treated with CIS, 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 on waist growth rate in the subjects treated with CSI is not statistically significant.

The average leg length increase difference in the subjects treated with CIS, compared with those of the control group was lower with a maximum value of 0.5 mm both one year and two years after the treatment, p was less than 0.86

The growth of the calf length in the subjects treated with CSI is statistically insignificant.

Regarding the plant length, the growth was lower in the subjects treated with CIS compared with the controls, with values up to 0.4 mm after one year of treatment and by 0.6 mm after two years of treatment, with p less than 0.85

Inhaled corticosteroids do not affect plant growth in length.

In the CSI treated subjects compared with controls, the mean difference of the cranial perimeter increase was approximately equal, with p less than 0.91.

Inhaled corticosteroids do not affect the growth of the skull circumference.

Regarding chest circumference, the average difference in growth was significantly lower in the subjects treated with CIS compared with the controls, with values up to 0.3 mm after one year of treatment and by 0.4 mm after two years of treatment, with p less than 0.91, being regarded as statistically insignificant.

Inhaled corticosteroids do not affect the chest circumference growth.

Regarding the arm circumference, there was a slight growth impairment in the subjects treated with CIS compared with the controls, with a maximum value decrease of 0.2 mm after one year of treatment and of 0.6 mm after two years of treatment, with p less than 0.85.

Inhaled corticosteroids do not affect the growth of the arm circumference.

On average, thigh circumference difference in growth was lower in the subjects treated with CIS compared with the controls, with values up to 1 mm after one year of treatment and of 0.6 mm after two years of treatment, with p less than 0.84.

Inhaled corticosteroids cause a statistically insignificant influence on thigh circumference.

In calf circumference, the average difference in growth was higher in the subjects of the control group than in those under inhaled corticotherapy with maximum values of 0.3 mm after one year of treatment and of 0.5 mm after two years of treatment, with p higher than 0.86.

Inhaled corticosteroids do not affect calf circumference growth.

The growth rate increase in the subjects treated with inhaled corticosteroids in low doses over two years is not significantly affected.

The growth rate of the subjects included in the study was similar to the literature data showing stronger growth and development during the school age of 10-16 years old.

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