

# STUDY ON ANTHROPOMETRY OF THE CHILDREN WITH ASTHMA TREATED WITH INHALED CORTICOSTEROIDS

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**Keywords:** asthma, inhaled corticosteroids

**Abstract:** Inhaled corticosteroids (ICS) used in long-term treatment in children with asthma can have negative effects on growth and development. We conducted the study over a period of two years, during which we measured a series of anthropometric parameters at intervals of six months. The results do not indicate a significant decrease in growth rate in the studied cases.

**Cuvinte cheie:** astm bronșic, corticosteroizi inhalatori

**Rezumat:** Corticosteroizii inhalatori (CSI) utilizați în tratamentul de lungă durată la copiii cu astm bronșic pot avea efecte negative asupra creșterii și dezvoltării acestora. Am efectuat studiul pe o perioadă de doi ani, timp în care am măsurat o serie de parametrii antropometrici la intervale de șase luni. Rezultatele obținute nu evidențiază o scădere semnificativă a ratei creșterii la cazurile studiate.

## INTRODUCTION

Asthma is a chronic inflammatory disease of the airways in which many cells and cellular elements play an important role. Chronic inflammation of the airways is associated with a very slow response from the body leading to recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or early morning. Asthma is a condition defined by clinical features, physiological and pathological ones (GINA 2010).

Inhaled corticosteroids (ICS) began to be increasingly used to treat asthma since asthma was labeled as a chronic inflammatory disease. ICS offers a wide range of inflammatory activity and have consistently shown that is the most effective mean to control asthma in childhood (17, 23.18).

Inhaled cortisone preparations are administered by different types of inhalation devices, preferring the ones with hydrofluoroalkane, affecting less the atmospheric ozone layer.

ICS is the first line therapy for patients with persistent asthma, they are only currently available therapy, which suppresses the asthmatic 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 (10). Under current guidelines, inhaled corticosteroids are the preferred first line treatment for children with asthma long term in all age groups (11), they represent the central axis of the treatment (21, 2), ICS being the "gold standard" in anti-inflammatory asthma therapy (8).

ICS represents the "cornerstone" in control of asthma control may be influenced by several factors, both behavioral and treatment-related, the result depending on how patients and carers cooperate in following the treatment properly administered (13). One of the advantages of using ICS is that their effect is very fast and prompt (19).

In practice we use low-dose of ICS with a comparable effect with moderate doses (24), our study with patients using

these low-dose ICS (Budesonide 200-400µg/day or Fluticasone 100-300µg/day). Opinion of many clinicians is to use small doses of ICS as to decrease the chances of us experiencing these adverse effects (16), other researchers indicate if the dose of ICS are not sufficient to associate with beta2 agonists (15). They are opinions which stresses that the use of ICS in acute asthma crises have a lower systemic corticosteroid administration (5).

Like most of corticosteroids, the inhalers can have adverse effects on long-term treatments, among which decreased growth and development (4), on which we focused the study. Regarding the adverse effects of ICS opinions are divided, some studies show that lower growth in children ICS asthma (12), but on the contrary others consider that the ICS do not have a negative influence on growth (22).

According to some authors is that the ICS should not be used routinely to treat acute asthma exacerbations (9), while others believe that treatment with only inhaled corticosteroid alone is not sufficient in controlling asthma, requiring association with beta2 agonists long-term (3).

## STUDY OBJECTIVE

The purpose of the study is conducted to investigate how to use of inhaled corticosteroids in children with asthma affects their growth rate.

## MATERIAL AND METHOD

Our study considered 200 subjects, 100 were children with mild or moderate asthma under treatment with low doses of ICS, and 100 were represented by the control group, children who did not have any chronic disease and did not have growth disorders. Subjects were divided into five age categories: under 8 years between 8 years and one day to 10 years, 10 years and a day and 13 years, between 13 years and a day and 16 and between 16 years and a day and 19 years. For each age group both witnesses and those with asthma and measurements were made at intervals of six months for two years, the following anthropometric parameters: height, leg length and the length of

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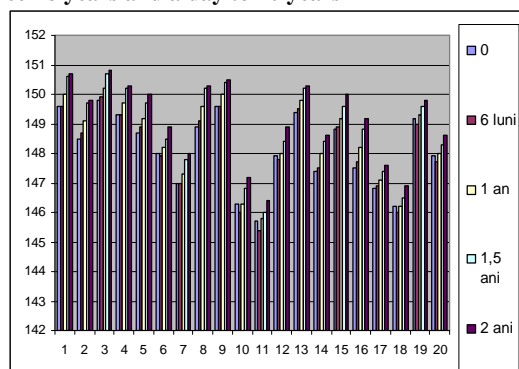
## RESULTS AND DISCUSSIONS

### 1. Height:

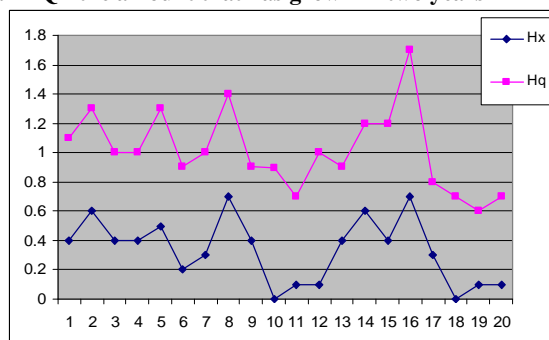
*Control group* under 8 years: from the measurements shows a mean difference of 0.70 mm in the first year and 1.32 mm in 2 years.

- The group 8 years -10 years and a day: from the measurements shows a mean growth difference of 0.45 mm and 1.07 mm after two years.

**Figure no. 1. Gf. 1 measured values in asthmatic children between 8 years and a day to 10 years**

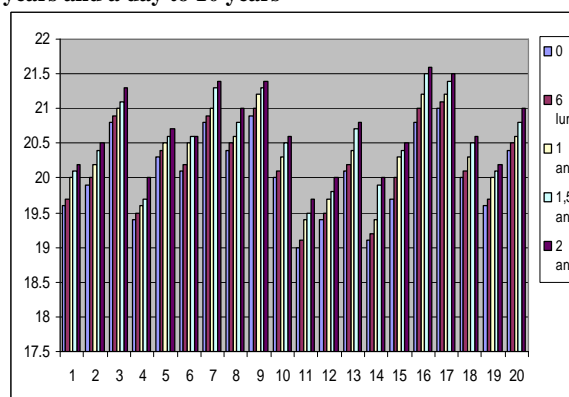


**Figure no. 2. Hx - the value of which increased in the first year HQ - the amount that has grown in two years**

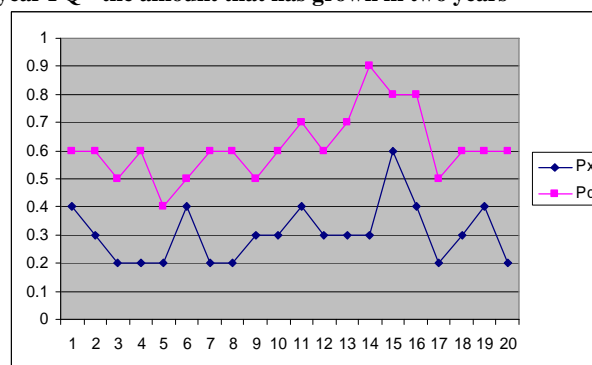


- The group 10 years and one day -13 years: from the measurements shows a mean difference of 1 year increase 0.77 mm and 1.16 mm at 2 years.
- The group 13 years and one day -16 years: measurements showed an average increase in a difference of 0.57 mm and 1.07 mm at 2 years.
- The group 16 years and one day -19 years: measurements revealed an average of 0.66 mm after one year and after two years of 1.36 mm.
- Lot *cases* under 8 years of measurements observed a mean difference in first year growth of 0.60 mm and 1.29 mm after two years.
- The group 8 years -10 years and a day: the measured values shows an average growth difference of 0.33 mm in year 1 and 1.02 mm after 2 years.
- The group 10 years and one day -13 years: the measurements showed a mean difference after the first year growth of 0.55 mm and 0.99 mm after 2 years.
- The group 13 years and one day -16 years: the measurements showed a mean difference of 0.44 mm growth in the first year and 1.03 mm at two years.
- The group 16 years and one day -19 years: the measured values show that the average difference of 0.56 mm growth is the first year and 1.33 mm after two years.

**Figure no. 3. Measured values in asthmatic children between 8 years and a day to 10 years**



**Figure no. 4. Px - the value of which increased in the first year PQ - the amount that has grown in two years**



### 2. Plant length:

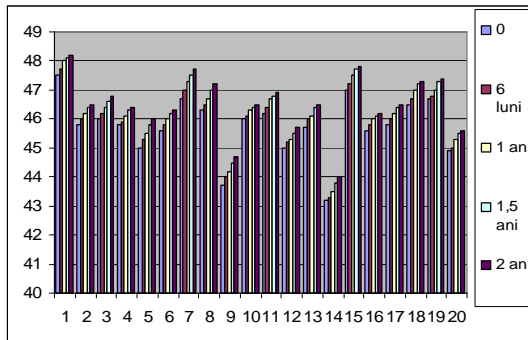
Lot *cases* under 8 years of measured values show that the average difference is 0.31 mm and 0.60 mm in the first year in 2 years.

- The group 8 years -10 years and a day: the measured values shows that the difference in growth after the first year was 0.30 mm and 0.61 mm after two years.
- The group 10 years and one day -13 years: the measured values we see that the average difference in growth after the first year was 0.28 mm and 0.55 mm after two years.
- The group 13 years and one day -16 years: the measured values we see that the average difference in growth after the first year was 0.27 mm and 0.51 mm after two years.
- The group 16 years and one day -19 years: the measured values we see that the average difference in growth in the first year was 0.26 mm and 0.49 mm after two years.
- The *control group* age group under 8 years of measured values can be seen that the average difference in growth after the first year was 0.30 mm and 0.62 mm after two years.
- The group 8 years and a day -10 years: an average measured values of the difference in growth after the first year of 0.34 mm and 0.67 mm after two years.
- The group 10 years and one day -13 years: measured values indicate an average growth difference of 0.31 mm in the first year and after two years of 0.61 mm.
- The group 13 years and one day -16 years: measured values lead to an average growth difference after the first year of 0.29 mm and 0.56 mm after two years.
- The group 16 years and one day -19 years: measured values lead to an average growth difference after the first year of 0.29 mm and 0.53 mm after two years.

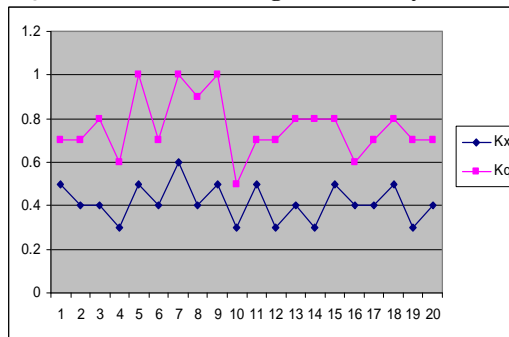
## CLINICAL ASPECTS

### 3. Leg length:

**Figure no. 5. Measured values in asthmatic children between 8 years and a day to 10 years**



**Figure no. 6. Kx - the value of which increased in the first year KQ - the amount that has grown in two years**



Lot *cases* under 8 years: measured values show an average difference of 0.47 mm and 0.84 mm in the first year after two years.

- The group 8 years -10 years and a day: you can see from measured made after the first year growth average difference of 0.41 mm and 0.76 mm after two years.
- The group 10 years and one day -13 years: measured values show an average growth difference of 0.42 mm a year and two years of 0.75 mm.
- The group 13 years and one day -16 years: the average measured values show a difference in the first year growth of 0.48 mm and 0.82 mm after two years.
- The group 16 years and one day -19 years: measured values show an average difference of 0.38 mm at 1 year and after two years of 0.70 mm.

*Control group* under 8 years of measured data is observed an average difference in the first year growth of 0.50 mm and 0.88 mm after two years.

- The group 8 years and one day -10 years: average values obtained show a difference in a growth of 0.43 mm and 0.79 mm after two years.
- The group 10 years and one day -13 years: average values obtained show a difference after the first year growth of 0.45 mm and 0.79 mm after 2 years.
- The group 13 years and one day -16 years: the values obtained shows an average increase of 0.52 mm difference in the first year and 0.85 mm after two years.
- The group 16 years and one day -19 years: the values obtained shows an average difference of 0.42 mm growth in the first year and 0.75 mm after two years.

### CONCLUSIONS

1. The height variation is found between the control group and those with asthma of between 0.10 mm and 0.22 mm in

the first year and 0.03 mm and 0.19 mm after two years.

2. The length of the plant there is a variation between 0.01 mm and 0.04 mm after the first year and 0.02 mm and 0.06 mm after two years.
3. The leg length variation is found between 0.02 mm and 0.04 mm after the first year and of 0.03 mm and 0.05 mm after two years.
4. We can say that the average difference in growth of the subjects under study leads to a result that confirms that the growth rate in children treated with inhaled corticosteroids in low doses is not significantly influenced by them.

### BIBLIOGRAPHY

1. Barnes PJ. Efficacy of inhaled corticosteroids in asthma). *J Allergy Clin Immunol.* 1998 Oct;102(4 Pt 1):531-8.
2. Berger WE, Shapiro GG. The use of inhaled corticosteroids for persistent asthma in infants and young children. *Ann Allergy Asthma Immunol.*2004 Apr;92(4):387-399; quiz 399-402, 463.
3. Cates CJ, Lasserson TJ, Jaeschke R. Regular treatment with formoterol and inhaled steroids for chronic asthma: serious adverse events. *Cochrane Database Syst Rev.*2009 Apr 15;(2):CD006924, CD007313.
4. Creese KH, Doull IJ. Effects of inhaled corticosteroids on growth in asthmatic children). *Curr Allergy Asthma Rep.* 2001 Mar;1(2):122-6.
5. Edmonds ML, Camargo CA Jr, Pollack CV Jr, Rowe BH. The effectiveness of inhaled corticosteroids in the emergency department treatment of acute asthma: a meta-analysis). *Ann Emerg Med.* 2002 Aug;40(2):145-54.
6. Gappa M, Zachgo W, von Berg A, Kamin W, Stern-Sträter C, Steinkamp G. Add-on salmeterol compared to double dose fluticasone in pediatric asthma: a double-blind, randomized trial. *VIAPAE Study Group. Pediatr Pulmonol.*2009 Nov;44(11):1132-42.
7. Gibson PG, Powell H. Initial corticosteroid therapy for asthma. *Curr Opin Pulm Med.* 2006 Jan;12(1):48-53.
8. Hansel TT. How do we measure the effectiveness of inhaled corticosteroids in clinical studies? *Respir Med.* 2004 Oct;98 Suppl B:S9-15.
9. Hendeles L, Sherman J. Are inhaled corticosteroids effective for acute exacerbations of asthma in children? *J Pediatr.* 2003 Feb;142(2 Suppl):S26-32; discussion S32-3.
10. Högger P. Dose response and therapeutic index of inhaled corticosteroids in asthma. *Curr Opin Pulm Med.*2003 Jan;9(1):1-8.
11. Jartti T. Inhaled corticosteroids or montelukast as the preferred primary long-term treatment for pediatric asthma? *Eur J Pediatr.*2008 Jul;167(7):731-6.
12. Miller JL. Inhaled corticosteroids may cause only temporary slowing of growth in children, studies suggest. *Am J Health Syst Pharm.* 2000 Dec 1;57(23):2142, 2149.
13. Murphy KR. Adherence to inhaled corticosteroids: comparison of available therapies. *Pulm Pharmacol Ther.* 2010 Oct;23(5):384-8. Epub 2010 Jun 11.
14. Ni CM, Greenstone IR, Ducharme FM. Addition of inhaled long-acting beta2-agonists to inhaled steroids as first line therapy for persistent asthma in steroid-naive adults. *Cochrane Database Syst Rev.* 2005 Apr 18;(2):CD005307.
15. Ni Chroinin M, Greenstone IR, Danish A, Magdolinos H, Masse V, Zhang X, Ducharme FM. Long-acting beta2-agonists versus placebo in addition to inhaled corticosteroids in children and adults with chronic asthma. *Cochrane Database Syst Rev.* 2005 Oct 19;(4):CD005535.
16. Powell H, Gibson PG. Inhaled corticosteroid doses in

## CLINICAL ASPECTS

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- asthma: an evidence-based approach. *Med J Aust.* 2003 Mar 3;178(5):223-5.
17. Price J. The role of inhaled corticosteroids in children with asthma. *Arch Dis Child.* 2000 Jun;82 Suppl 2:II10-4.
  18. Rachelefsky G. Inhaled corticosteroids and asthma control in children: assessing impairment and risk). *G.Pediatrics.* 2009 Jan;123(1):353-66.
  19. Rodrigo GJ. Rapid effects of inhaled corticosteroids in acute asthma: an evidence-based evaluation. *Chest.* 2006 Nov;130(5):1301-11.
  20. Shepherd J, Rogers G, Anderson R, Main C, Thompson-Coon J, Hartwell D, Liu Z, Loveman E, Green C, Pitt M, Stein K, Harris P, Frampton GK, Smith M, Takeda A, Price A, Welch K, Somerville M. Systematic review and economic analysis of the comparative effectiveness of different inhaled corticosteroids and their usage with long-acting beta2 agonists for the treatment of chronic asthma in adults and children aged 12 years and over. *Health Technol Assess.* 2008 May;12(19):iii-iv, 1-360.
  21. Thumerelle C, Santos C, Penel-Capelle D, Pouessel G, Deschildre A. Inhaled corticosteroids in asthma in infants and young children. *Arch Pediatr.* 2002 Aug;9 Suppl 3:390s-395s.
  22. Visitsunthorn N, Moungrnoi P, Saengsiriwut A, Wacharasindhu SJ. Linear growth of prepubertal asthmatic Thai children receiving long-term inhaled corticosteroids. *Med Assoc Thai.* 2002 Aug;85 Suppl 2:S599-606.
  23. Weltman JK. The use of inhaled corticosteroids in asthma. *Allergy Asthma Proc.* 1999 Jul-Aug;20(4):255-60.
  24. Zhang L, Axelsson I, Chung M, Lau J. Dose response of inhaled corticosteroids in children with persistent asthma: a systematic review. *Pediatrics.* 2011 Jan;127(1):129-38. Epub 2010 Dec 6.