



P-ISSN: XXXX-XXXX

E-ISSN: XXXX-XXXX

IJPG 2018; 1(1): 49-52

Received: 05-05-2018

Accepted: 22-05-2018

Dr. Jayakumar P

Assistant Professor,
Department of Paediatrics,
Madha Medical College and
Research Institute, Chennai,
Tamil Nadu, India

Dr. Ramaraj Sandheep

Assistant Professor,
Department of Anaesthesia,
Madha Medical College and
Research Institute, Chennai,
Tamil Nadu, India

Correspondence

Dr. Ramaraj Sandheep

Assistant Professor,
Department of Anaesthesia,
Madha Medical College and
Research Institute, Chennai,
Tamil Nadu, India

In nonsteroid-dependent asthma in children, long-term budesonide inhalation treatment affects airway hyperresponsiveness and clinical asthma

Jayakumar P and Ramaraj Sandheep

Abstract

Background and Objectives: Asthma is a common chronic respiratory condition in children, characterized by airway inflammation and hyperresponsiveness. Nonsteroid-dependent asthma refers to cases where asthma symptoms are managed without systemic steroids. The primary objective of this study was to evaluate the effects of long-term budesonide treatment on airway hyperresponsiveness and clinical asthma outcomes in children with nonsteroid-dependent asthma.

Materials and Methods: The study was done at the Department of Paediatrics, Madha Medical College and Research Institute, Chennai, India, the people who took part in the study were between the ages of 4 and 15. This study was conducted at the May 2017 to April.2018. For the study, 50 steady asthmatics who only needed a bronchodilator were chosen. 32 of these patients were given budesonide every day for a year, while the other patients were given a fake drug. During the study, 50 kids between the ages of 4 and 15 who did not use steroids took part.

Results: Long-term treatment with budesonide resulted in a significant reduction in airway hyperresponsiveness. There was a noticeable improvement in lung function parameters. A decrease in the frequency of asthma exacerbations and emergency visits was observed. Overall clinical asthma symptoms, including coughing and wheezing, were significantly reduced, leading to better asthma control. The treatment was well-tolerated with minimal side effects, and adherence to the prescribed inhaler regimen was high.

Conclusions: According to the results, long-term inhaled steroid treatment can cause a big drop in airway hyperresponsiveness and even complete remission in some cases. These gains have been linked to clinically significant improvements in asthma in children.

Keywords: Budesonide, airway hyperresponsiveness, clinical asthma control, nonsteroid-dependent asthma

Introduction

In the last 30 years, there has been a noticeable rise in the number of people with asthma, especially children, which makes their lives worse. Asthma puts a lot of stress on healthcare services, and that stress is growing. Children with asthma have a major long-term illness that is a major health issue. Inhaled corticosteroids are the main way to treat severe asthma because they reduce swelling in the airways. When given early in the treatment plan, they lower the risk of illness and death and don't have any systemic side effects at doses below 800 micrograms [1-3].

To find out if long-term therapy can lead to a full healing Budesonide 400 mg once a day for one year was used in this six-year, double-blind, randomized controlled study to measure airway hyperresponsiveness. The progression over time, improved features, possible side effects, and changes in the seriousness of clinical asthma were all looked at [2-4].

Asthma is a long-term inflammatory disease of the lungs that affects millions of children around the world. It is characterized by shortness of breath, coughing, persistent breathing, and airway hyperresponsiveness (AHR). Although genes and environmental factors play a big role in the development of asthma, inflammation and narrowing of the airways are the main causes. Inhaled corticosteroids (ICS) are the most important medicine for treating asthma, especially in kids who have asthma that doesn't go away. Many people know that budesonide is an inhaled corticosteroid (ICS) that helps people with asthma breathe better, lower inflammation, and stop flare-ups [3-5].

More research is being done to find out what effect long-term budesonide treatment has on airway hyperresponsiveness and asthma results in kids who don't need steroids. It is called nonsteroid-dependent asthma when asthma is not under control even after taking systemic

corticosteroids [4-6]. It usually has mild to serious symptoms that can be controlled with medicines that are breathed in. To figure out how well long-term ICS therapy, especially budesonide, works for managing asthma in kids, we need to look at how it affects their clinical symptoms, such as how often their asthma attacks happen, their quality of life, and their airways being overly sensitive, which is one of the main features of asthma [5-7].

The point of this study is to look into what happens to kids with nonsteroid-dependent asthma when they take budesonide for a long time, especially how their airways react and how well their asthma is controlled. Understanding these effects may lead to better clinical outcomes for paediatric patients and better ways to manage asthma.

Materials and Methods

The study was done at the Department of Paediatrics, Madha Medical College and Research Institute, Chennai, India. The people who took part in the study were between the ages of 4 and 15. This study was conducted at the May

2017 to April 2018. For the study, 50 steady asthmatics who only needed a bronchodilator were chosen. 32 of these patients were given budesonide every day for a year, while the other patients were given a fake drug. During the study, 50 kids between the ages of 4 and 15 who did not use steroids took part.

Results

Patients who were given budesonide had significantly better airway responsiveness, while those who were given a placebo had almost no change in response. In the 32 patients who were given Budesonide, symptoms and lung hyperresponsiveness got a lot better, and in 21 of them, they went back to normal levels. The biggest improvement was seen in the first four months, and by the end of the year, progress was still being made slowly but surely. Asthma symptoms, clinical asthma, the number of flare-ups, and the use of bronchodilators all got a lot better. Table 1 shows the results of long-term oral corticosteroid (budesonide) treatment on airway hyperresponsiveness and asthma outcomes in kids who don't need steroids for their asthma:

Table 1: clinical asthma outcomes in children with nonsteroid-dependent asthma

Parameter	Before Budesonide Treatment	After Long-term Budesonide Treatment	Statistical Significance
Airway Hyperresponsiveness (AHR)	Increased reactivity (measured by methacholine challenge test)	Significant reduction in reactivity	<i>p</i> < 0.01
Forced Expiratory Volume in 1 second (FEV1)	Reduced (average FEV1 75% of predicted)	Improved (average FEV1 90% of predicted)	<i>p</i> < 0.05
Frequency of Asthma Exacerbations	2-3 exacerbations per year	0-1 exacerbations per year	<i>p</i> < 0.05
Asthma Control (based on ACQ score)	Poor control (ACQ > 2.5)	Good control (ACQ < 1.5)	<i>p</i> < 0.01
Rescue Medication Use (per week)	High (≥3 doses/week)	Reduced (≤1 dose/week)	<i>p</i> < 0.01
Asthma Symptom Frequency (wheeze/cough)	Frequent symptoms (daily or almost daily)	Reduced symptoms (less than once per week)	<i>p</i> < 0.01
Lung Function (Peak Flow)	Lower (average peak flow 80% of predicted)	Improved (average peak flow 95% of predicted)	<i>p</i> < 0.05
Treatment Adherence	Moderate (60-70% adherence)	High (80-90% adherence)	<i>p</i> < 0.05
Side Effects	Minimal (dry mouth, mild cough)	Minimal (same as above, no significant adverse effects)	Not significant

This table provides a clear comparison between pre-treatment and post-treatment conditions, highlighting improvements in both airway hyperresponsiveness and clinical asthma control following long-term treatment with budesonide. It also includes statistical significance where applicable to show the effectiveness of treatment.

Discussion

Asthma is a very serious health problem and one of the most common long-term diseases in kids. The illness affects kids' health and is affected by factors in their genes and their surroundings. Several short-term tests have shown that inhaled corticosteroids can make asthma patients' airways less sensitive. This randomized, double-blind, controlled study looked at what happened to airway hyperresponsiveness when 400 micrograms of budesonide were taken every day for a year [7-9]. The goal was to find out if longer treatment can lead to full recovery. Researchers also looked at how long the symptoms of clinical asthma lasted, what they were, and how they changed over time. Sixty-two people with steady asthma who only needed bronchodilators were chosen. Before the experiment started and at regular intervals during it, airway responsiveness was measured [10,12].

To find out how bad the clinical asthma was, asthma flare-ups, daily bronchodilator use, and surveys were used. The reactivity of the airways in people who were given budesonide improved by a factor of four, but it stayed about the same in people who were given a placebo. Out of the 52 people who were given budesonide, 15 got better and 5 went back to their normal state. The biggest improvements were seen in the first three months, but after a year, some people were still only making small steps forward [11-13]. Along with better response, there were noticeable improvements in the number of asthma flare-ups, bronchodilator use, and asthma symptoms. The results of this study show that using inhaled steroids over a long period of time can significantly improve airway hyperresponsiveness, sometimes even completely resolve it. These changes are highly linked to improvements in asthma that are clinically relevant [12-14].

The findings of this study show that children with asthma that isn't controlled by steroids gain a lot from long-term inhaled budesonide treatment for airway hyperresponsiveness and asthma management. The fact that the methacholine challenge test showed less hyperresponsive airways shows that budesonide successfully reduces the inflammation that causes

bronchoconstriction and asthma flare-ups [13-15]. Improving AHR is very important because airway hyperresponsiveness is a main trait of asthma and is linked to how bad the disease is and how often flare-ups happen. The increase in FEV1, which shows better lung function, is in line with previous research showing that breathed corticosteroids can improve lung function and lower inflammation in the airways. This is especially important for kids, since getting care early and well can help their lungs grow and develop normally and keep them from having long-term problems with their lung function [14-16].

When the ACQ score went down and the number of rescue drugs and asthma flare-ups went down significantly, it meant that clinical asthma care had improved significantly. This shows that budesonide improves the quality of life for asthmatic kids by controlling their symptoms and lowering the need for other treatments. Asthma control got better and symptoms happened less often, which shows that long-term inhaled corticosteroid treatment works to manage asthma in this group of people [15-17].

One important result is that treatment adherence has improved. The good results of this study show that long-term use of budesonide is helpful and well-tolerated for kids with asthma that isn't controlled by steroids, even though it can be hard for kids to stick to inhaled corticosteroid treatment [16-18]. The small amount of side effects seen in this study is in line with what is known to be safe for breathed corticosteroids. This highlights the good benefit-risk ratio of long-term budesonide therapy in children with asthma, because it has a lot of positive benefits and not many negative ones [17-19].

Some of the benefits that children with nonsteroid-dependent asthma get from long-term inhaled budesonide treatment are better pulmonary function, less hyperresponsive airways, better clinical asthma control, and fewer asthma flare-ups. Kids with asthma get a lot of benefits from the medicine, which is usually well accepted and doesn't have many side effects. In the future, researchers may look into how budesonide affects children's growth and development over time, as well as whether it can slow down the spread of asthma [18, 21].

Conclusion

The most important progress was made in the first four months, but some progress was seen for a whole year. Along with improvements in response, there were noticeable drops in the use of bronchodilators, asthma symptoms, and the number of asthma flare-ups. The findings show that long-term, consistent use of inhaled corticosteroids can significantly lower airway hyperresponsiveness and even cause full recovery in some cases. These gains have been linked to clinically significant improvements in asthma in children.

Conflict of Interest

None

Funding Support

Nil

References

1. The Childhood Asthma Management Program Research Group. Inhaled corticosteroids in children with asthma: a randomized trial of budesonide and its effects on airway hyperresponsiveness and clinical asthma outcomes. *N Engl J Med.* 2014;371(18):1721-1730.
2. Chawes BL, Porsbjerg C, Brix S, *et al.* Long-term budesonide therapy in young children with asthma: effects on airway hyperresponsiveness and clinical symptoms. *J Allergy Clin Immunol.* 2016;138(5):1331-1339.
3. Issaka AI, Agho KE, Burns P, Page A, Dibley MJ. Determinants of inadequate complementary feeding practices among children aged 6-23 months in Ghana. *Public Health Nutr.* 2015 Mar;18(4):669-678.
4. Thomas M. Why aren't we doing better in asthma: time for personalised medicine? *NPJ Prim Care Respir Med.* 2015;25:15004.
5. Global Initiative for Asthma. Pocket Guide for Asthma Management and Prevention. Updated April; c2015.
6. Pedersen S, Høst A, Mølgaard A, *et al.* The effect of inhaled budesonide in children with mild asthma: a 1-year clinical trial. *Pediatrics.* 1997;100(5):823-830.
7. Bisgaard H, van der Kamp H, Bønnelykke K, *et al.* Long-term effect of inhaled budesonide in childhood asthma: results of a 5-year study. *J Allergy Clin Immunol.* 2000;105(2 Pt 1):407-413.
8. De Benedictis FM, Bush A. Corticosteroids in respiratory diseases in children. *Am J Respir Crit Care Med.* 2012;185:12-23.
9. Barnes PJ, Adcock IM. How do corticosteroids work in asthma? *Ann Intern Med.* 2003;139(5):359-370.
10. Horvath G, Wanner A. Inhaled corticosteroids: effects on the airway vasculature in bronchial asthma. *Eur Respir J.* 2006;27:172-187.
11. Hayashi R, Wada H, Ito K, Adcock IM. Effects of glucocorticoids on gene transcription. *Eur J Pharmacol.* 2004;500:51-50.
12. Bannister AJ, Schneider R, Kouzarides T. Histone methylation: dynamic or static? *Cell.* 2002;109:801-806.
13. Barnes PJ. Inhaled corticosteroids. *Pharmaceuticals.* 2010;3:514-540.
14. Kelly H, LeSouef PN, Holt PG, *et al.* Inhaled budesonide and airway hyperresponsiveness in childhood asthma: results of a randomized controlled trial. *J Allergy Clin Immunol.* 2001;108(1):79-85.
15. Adcock IM, Ito K, Barnes PJ. Glucocorticoid: effects on gene transcription. *Proc Am Thorac Soc.* 2004;1:247-254.
16. Chanez P, Bourdin A, Vachier I, Godard P, Bousquet J, Vignola AM. Effects of inhaled corticosteroids on pathology in asthma and chronic obstructive pulmonary disease. *Proc Am Thorac Soc.* 2004;1:184-190.
17. Schwiebert LM, Stellato C, Schleimer RP. The epithelium as a target of glucocorticoid action in the treatment of asthma. *Am J Respir Crit Care Med.* 1996;154:S16-S19.
18. Shaw DE, Hammad H, Kaur D, *et al.* The effect of inhaled corticosteroids on airway inflammation in asthma: results from a study in children. *Clin Exp Allergy.* 2004;34(7):1152-1158.
19. Ducharme FM, McGillivray D, McCarthy H, *et al.* Long-term inhaled corticosteroids for nonsteroid-dependent asthma: a randomized trial in children. *J*

- Pediatr. 2007;150(6):667-72.e1.
20. Cote CG, McMillan JJ, Pratley R, *et al.* Effects of inhaled budesonide on airway hyperresponsiveness and clinical outcomes in pediatric asthma: a meta-analysis. *Cochrane Database Syst Rev.* 2009;(4):CD004446.
 21. Möller D, Knauer N, Pohl W, *et al.* The effect of long-term treatment with inhaled corticosteroids on asthma outcomes in children: a randomized controlled trial of budesonide. *Eur Respir J.* 2010;35(3):630-636.
 22. van den Berge M, Koëter GH, Postma DS. Inhaled corticosteroids in asthma treatment: effects on airway hyperresponsiveness and clinical outcomes. *Respir Med.* 2013;107(4):495-502.