Journal of Neonatal and Pediatric Medicine
ISSN: 2572-4983

Xiaoyu, et al., Neonat Pediatr Med 2016, 2:1
DOI: 10.4172/2572-4983.1000108

Case Report Open Access

# Magnesium Sulfate Combined Montelukast Sodium Clinical Observation on Treatment of Infantile Asthma

**Xiaoyu M*, Yuntao M and Haitao W**

*Department of Pediatrics, Zhenan County Maternal and Child Health Care, Zhenan, Shaanxi, China*

***Corresponding author:** Department of Pediatrics, Zhenan County Maternal and Child Health Care, Zhenan, Shaanxi, China, Tel: +86 15398082028; E-mail: jiaofy@yeah.net

**Received date:** April 06, 2016, **Accepted date:** April 28, 2016, **Published date:** May 2, 2016



## Abstract

**Objective:** To observe the application of magnesium sulfate combined Montelukast pediatric asthma clinical curative effect of sodium.

**Methods:** Select zhenan county maternity and child care in November 2014 to November 2015 treated 66 cases of children asthma, randomly divided into control group and research group, 33 cases in each group, control group given conventional treatment, treatment group on the basis of this combined with magnesium sulfate and montelukast sodium, adjuvant therapy, observe the therapeutic effect of two groups.

**Results:** The treatment group effective rate was 96%, better than the control group 81%, comparing the two groups have significant difference ($P < 0.05$), and the symptoms disappear time significantly less than the control group.

**Conclusion:** The application of combined montelukast sodium and magnesium sulfate on infantile asthma with obvious therapeutic effect, less adverse reaction, worth clinical promotion.

**Keywords:** Pediatric asthma; Magnesium sulfate; Montelukast sodium clinical curative effect

## Introduction

Asthma is a common disease worldwide, the prevalence of adults around the world more than one over ten [1], the prevalence in children is higher than that of a third, and the prevalence is on the rise, especially children asthma has become a global concern of the public health problems [2].

Infant asthma is a common disease and frequently encountered disease in pediatrics, have disease urgent, accompanied by expiratory wheezing, cough and gasp the and so on, the cause is relatively complex, once the onset, easy to cause a variety of complications, severe cases may even lead to illness children [3].

Asthma is common clinical symptom of infants and young children period, multiple from 0 to 3 years old. Corticosteroids and bronchodilator in the treatment of asthma, such as ß2 agonists is a global initiative of asthma, or GINA [2] the recommended treatment. In recent years, magnesium sulfate become another trend for the treatment of asthma.

From November 2014 to November 2015, on the basis of routine comprehensive treatment through intravenous magnesium sulfate and oral montelukast sodium chewable tablets to treat 66 cases of childhood asthma acute attack, effect is good, presently reports as follows:

## Clinical data

### Average data

There are 66 cases who are of infants and young children bronchial asthma in our hospital pediatric, admitted meeting the Chinese medical association branch of pediatrics breathing committee revised the "child bronchial asthma diagnosis and prevention guide" [4] in 2008, Without merge pulmonary embolism, heart failure, pneumothorax patients, blood oxygen saturation were > 85%. Ages of 0 to 3 years old, they were randomly divided into two groups: treatment group of 33 people, 18 were male, female 15 cases; Control group 33 groups, 17 were male, female 16 cases. Two groups from the aspects such as age, gender, history of allergies, there were no significant difference after statistics processing ($P > 0.05$), comparable.

### Treatment control group

Treatment control group give routine anti-infection (mainly including the rational use of antibiotics), oxygen, glucocorticoid (Hydrocortisone, 3-5 mg/kg each time, 1-2 times / day), ß2 agonists (Salbutamol Sulfate Solution for Inhalation)and atomization inhalation therapy, treatment group on the basis of it added with 25% magnesium sulfate, 0.1 to 0.16 ml/kg each time, drug concentration of 0.5% to 1.5%, 1-1.5 drops dripping speed/kg, (according to the illness can be repeated every 6 hours, 1-4 times per day; static drops to asthma improved); Montelukast sodium chewable tablets, 2 to 3 years old, 4 mg, once every night, oral.

### Curative effect of standard

1) Excellent: Breath hold back better, lung sound disappeared, cough disappeared or significantly reduce, within 1 week.

2) Effective: Asthma to mitigate any, lung sound reduction, cough reduce, within 1 week.

3) Invalid: Children with symptoms and signs has no obvious improvement, or even worse, within 1 week. Total effective rate = (cases were markedly improved + effective cases)/total number of cases by 100%.

### Statistical methods

Statistical methods using SPSS17.0 statistical software for analysis. Measurement data with X + S said, is compared between group by t test, with $P < 0.05$ for the difference was statistically significant.

## Result

Two groups of curative effect comparison: treatment group in 33 cases, 23 cases were markedly effective, effective 9 cases, 1 had no effect, effective rate was 96%, no obvious adverse reactions. Control group 33 cases, 14 cases were markedly effective, effective 13 cases, 6 cases ineffective, effectiveness 81%, comparing the two groups have significant difference ($P < 0.05$) (Table 1).

| Group | Markedly effective | Invalid | Total | Effective rate (%) |
|---|---|---|---|---|
| Control group (n = 33) | 14 | 13 | 6 | 81 |
| Observation group (n = 33) | 23 | 9 | 1 | 96 |

**Table 1:** Treatment effect comparison table.

Thus observed, combined with magnesium sulfate and montelukast sodium in the treatment of bronchial asthma, the treatment curative effect is more remarkable than conventional treatment, adverse reaction.

## Discussion

Bronchial asthma is a kind of chronic airway inflammation, which characterized by airway hyperresponsiveness and reversible airway obstruction, a variety of inflammatory cells and inflammatory mediators involved in asthma airway inflammation process [1]. So the goal of treatment is to control inflammation as soon as possible, remove the airway smooth muscle spasm, reduce airway hyperresponsiveness. Long-term repeated use of ß2 agonists lead to desensitization phenomenon in patients, and magnesium, as a kind of important auxiliary factors of enzymatic reaction, low magnesium, magnesia lead to smooth muscle contraction and expansion respectively, therefore, theoretically patients use ß2 agonist invalid can achieve good effect if they use magnesium ions [5]. For routine treatment of asthma can't control, the choice of intravenous magnesium sulfate can be used as adjuvant therapy [6]. At present, it is considered that the smooth wheezing mechanism of magnesium sulfate has [6-10] :

1) Limit internal flow of calcium ions, inhibit the release of calcium ions endoplasmic reticulum, reduce the concentration of calcium ion in the smooth muscle cells, and inhibit the interaction between calcium ion and myosinrelax muscle cells, thereby expanding bronchi;

2) Stability of T cells, inhibit mast cell degranulation, reduce the release of inflammatory mediators in the body, and can inhibit cholinergic movement nerve endings release acetylcholine, thereby reducing the excitability of muscle;

3) Increase the number of ß2 receptor and its affinity with ß2 agonists combination;

4) Against hypoxia caused by the capillaries and small artery spasm, reduce afterload heart, the lung blood loss indirectly improve the symptoms of respiratory function and lack of oxygen;

5) Magnesium ions with dilated bronchi, reduce the release of inflammatory mediators, stimulate the role of nitric oxide and prostaglandin produced, so as to relieve the symptoms of acute attack of asthma.

Intravenous magnesium sulfate with no serious adverse reaction, does not cause low blood pressure, also won't affect pulse and breathing, a handful of patients will appear red face, pain at the injection site, and tired, but are self-limiting, for patients with kidney disease and small bowel underpowered, magnesia hematic disease may occur. Rowe, et al. [11] think, magnesium sulfate may shorten the treatment time of patients in the emergency department. At the same time, Cheuk [12] research shows, such as magnesium sulfate group of patients with asthma symptoms score and lung index were improved, but cannot influence the vital signs of patients received magnesium sulfate [11,13]. So far, all the application of magnesium sulfate in the treatment of acute asthma has not been found intravenous magnesium sulfate has significant adverse reactions [13]. In recent years, the study also considered leukotriene arachidonic acid metabolites that can induce airway in patients with asthma, and other organizations to produce a large number of inflammatory reaction, namely, smooth muscle spasm, changes in blood flow, blood plasma leakage, mucus secretion and inflammatory cells activated [14]. Therefore, leukotriene plays an important role in the pathogenesis of asthma. Montelukast sodium is a kind of long-term and selective leukotriene receptor antagonists, mainly by blocking cysteine leukotriene and exists in all kinds of cell surface receptors, make cysteine acyl inflammatory effect of leukotriene interruption, thus reduce mucus swelling, increased airway secretions, to alleviate muscle convulsion, reduce the infiltration of inflammatory cells in the airway wall, thus improving the airway hyperresponsiveness [15,16]. At the same time can supplement glucocorticoid can't cover that part of the anti-inflammatory effects [17], so as to play a better curative effect. To sum up, the static drop of magnesium sulfate combined oral montelukast sodium is one of the effective methods to treat asthma in children, from the experimental results can be confirmed its effect, this treatment method is simple, easy and cheap, small adverse reactions, worthy of popularization and application in grassroots hospital.

## References

1. Hong C, Wei-Qiang S (2007) Leukotriene antagonists joint glucocorticoid treatment the curative effect of chronic mild persistent bronchial asthma. Guangdong medicine 28: 1521-1522.
2. Global Strategy for Asthma Management and Prevention.
3. Gao M, Qian L (2012) Joint ladder scheme infant wheezing curative effect and safety study. Chinese journal of practical pediatrics 27: 202-205.
4. The eight edition of pediatrics, People's medical publishing house 06: 273-274.

5. Jennifer lee, Yin KS, Cai YU (2005) Asthma learning (2ndEdn), People's Medical Publishing House, Beijing pp: 406-407.
6. Gourgoulianis KI, Chatziparasidis G, Chatziefthimiou A, Molyvdas PA (2001) Magnesium as a relaxing factor of airway smooth muscles. Journal of aerosol medicine 14: 301-307.
7. Corbridge TC, Hall JB (1995) The assessment and management of adults with status asthmaticus. American journal of respiratory and critical care medicine 151: 1296-1316.
8. Mangat HS, D'Souza GA, Jacob MS (1998) Nebulized magnesium sulphate versus nebulized salbutamol in acute bronchial asthma: a clinical trial. European Respiratory Journal, 12: 341-344.
9. Bichara MD, Goldman RD (2009) Magnesium for treatment of asthma in children. Canadian Family Physician 55: 887-889.
10. Guerrera MP, Volpe SL, Mao JJ (2009) Therapeutic uses of magnesium. American family physician 80: 2.
11. Rowe BH, Bretzlaff JA, Bourdon C, Bota GW, Camargo Jr CA (2000) Magnesium sulfate for treating exacerbations of acute asthma in the emergency department. Cochrane Database Syst Rev 2: 1.
12. Cheuk DKL, Chau TCH, Lee SL (2005) A meta-analysis on intravenous magnesium sulphate for treating acute asthma. Archives of disease in childhood 90: 74-77.
13. Rowe BH, Bretzlaff JA, Bourdon C, Bota GW, Camargo CA (2000) Intravenous magnesium sulfate treatment for acute asthma in the emergency department: A systematic review of the literature. Annals of emergency medicine 36: 181-190.
14. Barnes NC, Smith LJ (1999) Biochemistry and physiology of the leukotrienes. Clinical reviews in allergy & immunology 17: 27-42.
15. Jeff W (2002) Leukotriene receptor antagonist, A good option for treating children asthma. The 8th National Conference on Children Pediatric Respiratory System Disease, Haikou 10: 27.
16. Bisgaard H, Nielsen KG (2000) Bronchoprotection with a leukotriene receptor antagonist in asthmatic preschool children. American journal of respiratory and critical care medicine 162: 187-190.
17. Stelmach I, Korzeniewska A, Stelmach W, Majak P, Grzelewski T (2005) Effects of montelukast treatment on clinical and inflammatory variables in patients with cystic fibrosis. Annals of Allergy, Asthma & Immunology 95: 372-380.