

Clinical Study of Azithromycin in Treatment of Respiratory Tract Infections in Children

Fei Qian*, Ershang Yang and Haoyuan Zheng

The Pediatric Hospital of Sihui City, Sihui, Guangdong 526200, China

ABSTRACT Objective: To observe the clinical efficacy and safety of azithromycin in the treatment of respiratory tract infections in children. **Method:** This study was select 110 cases of respiratory tract infection in our hospital from April 2013 to December 2014 as the research object. According to the random grouping method, the children were divided into two groups, 55 cases in the control group and 55 cases in the treatment group. On the basis of conventional treatment, the control group was treated with erythromycin 15 to 30 mg/kg per day for 1 week while for the treatment group was treated with Azithromycin 10 mg/kg per day by intravenous drip, and 8 mg/kg per day was administered orally for 4 days. To observe the clinical symptoms, signs, chest X-ray and adverse reactions of two groups before and after treatment. **Results:** The treatment group cure rate was significantly higher than that of the control group ($p < 0.05$), cough and fever disappearance time is shorter than that of the control group ($p < 0.05$), adverse reactions occurred rate of treatment group was lower than that of the control group ($p < 0.05$). **Conclusion:** The efficacy of azithromycin in the treatment of respiratory tract infections in children is reliable, less adverse reactions and it is worthy of promotion.

KEYWORDS

Azithromycin
Erythromycin
Children
Respiratory tract infection

1. Introduction

Mycoplasma pneumoniae is a infection of the lung caused by *Mycoplasma pneumoniae* which also can be referred to as primary atypical pneumonia. The disease has a slow onset on patients accompanied with fever and cough symptoms. Patients usually present with a small amount of mucus or purulent sputum, consciousness appears bloody sputum symptoms. However, patients with pulmonary disease signs are not obvious where at serious stage can cause the patient's death. *Mycoplasma pneumoniae* often occurs in children and adolescents, the incidence of pneumonia is about 15~30% of the probability. *Mycoplasma pneumoniae* is one of the common diseases of respiratory tract infections. Because of its relatively weak immunity and resis-

tance, children are susceptible to respiratory tract infections. Azithromycin is a new type of antibiotic with good oral absorption, high concentration of tissue and cell, long half-life, less adverse reactions and mild [1], has been used in the treatment of pediatric respiratory tract infections in recent years. In our hospital from April 2013 to December 2014, there were 55 cases of pediatric respiratory tract infections were treated with azithromycin.

2. Materials and methods

2.1. General information

This study selected 110 patients with respiratory tract infection in our hospital from April 2013 to December 2014 as a study object including children aged 6 months to 12 years old, mean age (6.80 + 2.10), which 64 cases of male, 46 cases of female, 53 cases of acute bronchitis, 29 cases of acute tonsillitis, 23 cases of acute pharyngitis, pneumonia in 5 cases. All cases are in line with respiratory tract infection diagnosis standard [2]. The exclusion criteria. Cases of the exclusion of immune deficiency, congenital heart disease, liver disease and allergic to the great circle of the drug in order to ensure that the children were not used antibiotics or traditional Chinese medicine before admission. Randomly subject were divided into treatment group and

Copyright © 2015 Fei Qian *et al.*

doi: 10.18686/aem.v4i2.2

Received: February 13, 2015; Accepted: April 25, 2015; Published online: May 13, 2015

This is an open-access article distributed under the terms of the Creative Commons Attribution Unported License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Corresponding author: The Pediatric Hospital of Sihui City, Sihui, Guangdong 526200, China. E-mail: qianfei_1988@163.com

control group where the two groups of age, gender and clinical performance were comparable such as no statistical significance ($p > 0.05$),

2.2. Method

2.2.1 Conventional therapy

Two groups were given conventional treatment of phlegm, cough, fever, calm. During the treatment period, patients were closely monitored with various physiological and biochemical index, before and after the treatment. The detection of abnormal in blood routine, urine routine, liver and renal function was watched and timely adjustment of the treatment or dose. Nutrition plus adrenal cortical hormone intravenous drip for 3 to 5 days were given as appropriate treatment for pleurisy and concurrent asthma and other pulmonary complications. Obviously intermittent oxygen therapy was given to treat the anoxic person [3].

2.2.2. Contrast therapy

In the control group, 18–25 mg/kg of erythromycin was dissolved in 8 mL sterile water, mixed with 5% glucose liquid and top up to 100 mL every 2–4 hours per day for 1 weeks.

Treatment group: 8 mg/kg per day injection with 5% glucose, by intravenous for every 3–4 hours for one times a day, while 8 mg/kg per day was administered orally for 4 days after discontinuation of the drug.

2.3. Curative effect judgment

Refer to the national Ministry of Health issued in 1993 and the antibacterial drug clinical research guiding principle, grades of evaluation were divided into four stages; (1) Healing: symptoms, signs, laboratory and pathogen were completely recovered. (2) Effect: condition improved markedly, but the four have a not fully recovered to normal; (3) Progress: after the medication condition has improved, but obviously not enough, (4) Invalid: no medication after 72 hours, the patient's condition was not improved obviously and even sicker. The total effective = $(1 + 2 + 3) / (1 + 2 + 3 + 4) * 100\%$.

2.4. Statistical methods

All the data in this study were processed by SPSS 17.0 sta-

tistical software. The differences between two averages were compared using t test, two sample rate or composition were compared by Chi-Square test. Results ($\bar{x} + s$) indicated that the difference was statistically significant when $p < 0.05$.

3. Results

Two groups of children with symptoms and signs of improvement time comparison. From Table 1, the treatment group of children with cough time ($4.68 + 0.99$) d, time to defervescence ($2.25 + 0.89$) d, and rales disappearance time of ($3.12 + 0.98$) d, while the control group of children with cough time is ($8.05 + 1.11$) d, time to defervescence ($4.25 + 1.02$) d and rales disappearance time ($5.86 + 0.84$) d). Comparison of fever, cough and rales between these two groups showed that azithromycin group was shorter than that of erythromycin group, $p < 0.05$, suggesting that azithromycin group curative effect is better than that of erythromycin group (Table 1).

3.2. Clinical comparison of two groups

From the Table 2, the treatment group of children cured 25 cases, markedly effective in 18 cases, progress in 11 cases while in the control group, there was 10 cases for cure, 21 cases were markedly effective and 17 cases is in progress. The total effective rate of azithromycin group was 98.2% compared to control group where the total effective rate was 87.2%. The effect was better in azithromycin group that that of erythromycin group thus indicated that the efficacy of azithromycin group was better than that of erythromycin group.

3.3. The incidence of adverse reactions in the two groups

In treatment group, 2 patients (3.6%) had mild gastrointestinal discomfort, nausea and anorexia, and the symptoms were relieved after adjustment. The control group had 9 cases (16.4%) with obvious digestive tract reaction, such as nausea, vomiting, abdominal pain, anorexia, 3 cases were relieved and 2 cases were treated with ALT and AST. The incidence of adverse reactions of the two groups were 3.6% and 16.4% and the difference between the two groups was

Table 1. The improvement of symptoms and signs in the two groups (d).

Group	n	Relieve a cough	Defervesce	Rales
Treatment group	55	4.68 ± 0.99	2.25 ± 0.89	3.12 ± 0.98
Control group	55	8.05 ± 1.11	4.25 ± 1.02	5.86 ± 0.84
<i>p</i>	-	< 0.05	< 0.05	< 0.05

Table 2. Comparison of the clinical efficacy of the two groups after treatment (n %).

Group	n	Cure	Excellence	Progress	Invalid	Total effective
Treatment group	55	25 (45.5)	18 (32.7)	11 (20.0)	1 (1.8)	54 (98.2)
Control group	55	10 (18.2)	21 (38.1)	17 (30.9)	7 (12.8)	48 (87.2)

significant difference $p < 0.05$.

4. Discussion

Respiratory tract infection in children is more complicated with the present of infection of virus or bacterial infection where fever and cough are the main symptoms. The trachea and bronchial lumen of children is relatively narrow thus make the mucus secretion is little. Due to the cilia movement is poor, it will result the lung's tissues lost its elasticity and this will easy to be congested. It is even worst when combined with bad air quality where the lung will contains less gas and the cough reflex becomes relatively weak. Therefore, is very important for early treatment of children with respiratory tract infection. Commonly, antibiotics were used in clinic as a comprehensive treatment in combating problems with fever and cough. In addition, acute upper respiratory tract infection is also a common disease of children where it plays a major role in nasal, nasopharyngeal and oropharyngeal. Therefore, acute upper respiratory tract infection is also known as "acute nasopharyngitis", "acute pharyngitis" and "acute tonsillitis". However, it is more generally known as upper respiratory tract infection. Symptoms of nasopharyngeal infection usually accompany with complications, and may spread to adjacent organs, for example, throat, trachea, lung, oral cavity, sinuses, middle ear, eye and neck lymph nodes and other parts. In some cases, the symptoms of nasopharyngeal disease in children are improved or disappeared, but the disease complications are still affected or worse. In order to improve the efficiency of the treatment, it is convenient to do early diagnosis in giving the appropriate treatment to the children so the clinical characteristics of upper respiratory tract infection can be accurately located and analyzed [4].

Azithromycin is a new generation of antibiotics, and the antibacterial mechanism of erythromycin is similar to the 50S subunit of the bacterial ribosome. The inhibition is depends on RNA protein synthesis, long half-life, high tissue concentration and absorption with a broad antibacterial spectrum. As a result, the effect is relatively high, and the side effect is relatively small. Azithromycin curative effect

was significantly higher than that of erythromycin where the cough time, cooling time, rales disappearance time was shorter than that of erythromycin thus it adverse reaction is lower than that of erythromycin as it is similar with the Yin peach report [5]. In summary, the efficacy of azithromycin in treatment of children with respiratory tract infections was significantly higher than that of erythromycin, and the course of treatment is short, the application is simple, and it is worthy of wide application.

To sum up, the treatment of pediatric respiratory tract infection in patients with the implementation of the method has clinical value which can significantly improve the treatment effect, effectively alleviate the clinical symptoms and reduce the suffering of children.

Conflicts of interest

These authors have no conflicts of interest to declare.

Authors' contributions

These authors contributed equally to this work.

References

1. Qi Y. Azithromycin Sequential Therapy in the treatment of severe pneumonia mycoplasma pneumonia curative effect observation. *Journal of Applied Clinical Pediatrics*. 2003;18(10):847–848.
2. Yin T, Jiang Y. Study on the treatment of *mycoplasma pneumonia* in children with azithromycin and erythromycin. *Chinese Journal of antibiotics*. 2002;27(4):240–241.
3. Li Z. Ceftriaxone with azithromycin in treatment of children with acute lower respiratory tract infection curative effect observation. *The Hospital Infection Journal*. 2013;11(10):2728–2730.
4. Li XH. Azithromycin Sequential Therapy Combined with Tanreqing Injection in the treatment of children with acute lower respiratory tract infection in 60 cases clinical analysis. *Contemporary Chinese Medicine*. 2012;20(2):95–97.
5. Luan JQ. Cephalosporins combined with azithromycin in the treatment of children with acute lower respiratory tract infection of efficacy and safety evaluation. *Chinese Modern Drug Application*. 2010;19(17):110–111.