

Clinical effect of sequential therapy with azithromycin in children mycoplasma pneumoniae pneumonia

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Abstract: In the present study, the clinical effect of Sequential Therapy with Azithromycin in children mycoplasma pneumoniae pneumonia is observed and analyzed. The 160 children who were diagnosed as mycoplasma pneumoniae pneumonia were selected as subjects. They were randomly divided into two groups: study group and reference group and each group with 80 cases. Among them, the children in study group were carried out sequential therapy of erythromycin and the sequential therapy of azithromycin in reference group. The overall treatment efficiency, the incidence of adverse reactions, the time of symptom recovery and hospitalization were compared between the two groups. Through comparing the efficiency of overall treatment between two groups, the study group has more significant advantages than reference group: $P < 0.05$; through comparing the time of symptoms recovery and hospitalization, study group is significantly less than reference group: $P < 0.05$; in addition, through comparing the incidence of adverse reactions, the difference between two groups is not obvious: $P > 0.05$. For sequential therapy of azithromycin in children mycoplasma pneumoniae pneumonia, it can achieve good therapeutic effect and has no serious adverse reactions, which has tremendous applied values.

Keywords: Azithromycin, sequential therapy, mycoplasma pneumoniae pneumonia, child patient, therapeutic effect.

INTRODUCTION

In pediatric department, mycoplasma pneumoniae pneumonia is a relatively common disease and multiple ages are between 5 and 15 years old. The onset season of this disease is irregular and it can happen all the year round. Because this disease is usually acute, it has a serious impact on children's physical health, causing a certain pain to children and reducing the quality of life (Qie, 2017; Peng, Feng, Zhang, Xu, Wu, 2016). Related data shows that in infantile infectious diseases, the incidence of mycoplasma pneumoniae pneumonia in children is about 30% (Liang, 2016; D'Souza, Rahaman, 2018).

The mycoplasma pneumoniae pneumonia is caused by mycoplasma pneumoniae (as shown in fig. 1), whose clinical symptoms include fever, sore throat, expectoration and sub-sternal pain and so forth. It can cause dysfunction of multi-organ and multi-system. If such children fail to carry out treatment in time, it will further cause such symptoms as interstitial fibrosis, bronchiectasis and atelectasis and so on, which will threaten the safety of children. This paper observes and analyzes the clinical effect of azithromycin used by sequential treatment in children mycoplasma pneumoniae pneumonia.

MATERIALS AND METHODS

The subjects of this study are 160 children with mycoplasma pneumoniae pneumonia (fig. 2) in Jining

No.1, Pepole's Hospital during the periods from June 2015 to December 2017. This paper has a rigorous structure, and the conclusion has been approved by relevant ethics and relevant departments. The inclusion and exclusion criteria of children meet the following aspects: etiological examination, chest radiograph, symptoms and signs examination, which all meet the diagnostic criteria for children mycoplasma pneumoniae pneumonia. Clinical symptoms include fever, cough, pulmonary rales and so on (Kensei *et al.*, 2012; Farid *et al.*, 2018). There are no children with dysfunction of heart, liver and kidney, and coagulation system disease.

Child patients and their families signed the formal informed consent. The children are randomly divided into study group and reference group, each group with 80 cases. The study group has 43 cases of male patients and 37 cases of female patients, aging from 3 to 14 years old and the average age being (8.69 ± 2.01) ; reference group has 41 cases of male patients and 39 cases of female patients, aging from 4 to 13 years old and average age being (9.50 ± 2.23) . Compared with the relative data between two groups of children, the results show that there is comparability: $P > 0.05$.

After entering the hospital, two groups of children undergo general routine treatment measures, including cough treatment, expectorant, anti-allergy, asthma and other symptomatic treatment, which makes patients' respiratory tract smooth.

(1) Therapeutic method in reference group. For erythromycin treatment on patients in reference group, the

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intravenous injection of erythromycin was implemented (Hunan Kelun Pharmaceutical Co., Ltd., batch number was SFDA approval number: H43020028) with the dosage of 10-25mg. At the first 5 days, this kind of treatment was carried out once a day. On the sixth day, taken oral erythromycin with 10mg-25mg each time for a week in succession and three times a day.



Fig. 1: Mycoplasma pneumoniae.

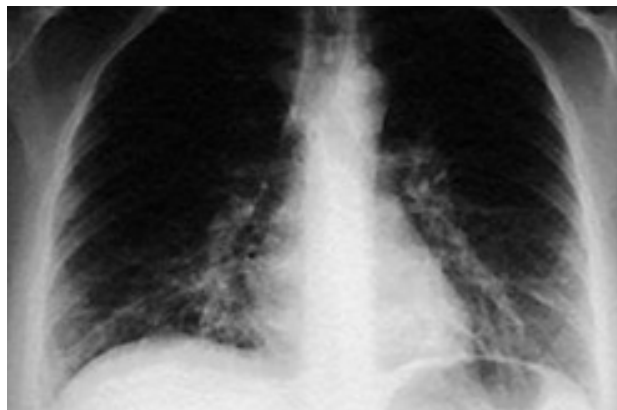


Fig. 2: Imaging examination of one patient.

(2) Treatment methods of children in study group. For the sequential therapy of azithromycin in study group, intravenous infusion of azithromycin is implemented (Hunan Kelun Pharmaceutical Co., Ltd., batch number: B17030506) with five days of intravenous infusion in succession and daily dosage being 10mg. After four days without drug used, then oral azithromycin was taken, once a day with a dose of 10mg and a continuous dose of three days.

Observing index

The total effective rate of the two groups of children was observed and recorded. The evaluation criteria for recovery: after treatment, clinical symptoms and signs disappear and after X-ray examination as well as other auxiliary examination, the results don't show any abnormal problems (Zhou 2017; Kanwal *et al.*, 2018); effective evaluation criteria: clinical symptoms and signs

were significantly improved, the result of X-ray examination showed that shadow focus is absorbed and laboratory examination showed a significant improvement; the standard of effective evaluation was that the clinical symptoms and signs have relieved and shadow focus has seen in chest compared with prior treatment (fig. 3); invalid evaluation standard was that compared with prior treatment, there was no difference in patient children. Compared with recovery time of the two groups, including the time of antipyretic, cough and the disappearance time of wet rale, the time of hospitalization was recorded. In addition, the adverse reaction of the children is recorded.

STATISTICAL ANALYSIS

The used statistical analysis software was SPSS21.0. The measurement data is expressed in the way of mean \pm average ($\bar{x} \pm s$) and t was used for group comparison. Counting data is expressed by natural number (n) and percentage (%) and chi square were used for group comparison. When $P < 0.05$, it has statistical value.

RESULTS

Comparison of the total effective rate between two groups of children

As recorded in table 1, through observing and recording children's overall treatment efficiency, it shows that the overall effective rate of study group was higher than reference group and there was a significant difference between the two groups. If $P < 0.05$, statistical significance exists.

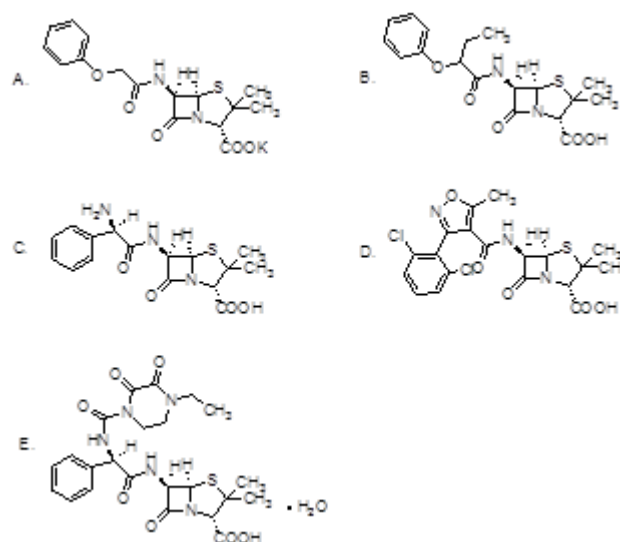


Fig. 3: Structural formula of macrolide molecular.

Comparison of the time for recovery and hospitalization between the two groups

As recorded in table 2 through comparing the relief time of clinical symptoms, it shows that the time of improvement in study group is less than reference group

Table 1: Comparison of the total effective rate between two groups of children [n(%)]

Group	Recovery	Efficiency	Validity	Invalidity	Overall Treatment Efficiency
Study Group(n=80)	52	12	10	3	77(96.25)
Reference Group(n=80)	40	11	15	14	66(82.50)
X ²					10.29
P					<0.05

Table 2: Comparison of the time for recovery and hospitalization between the two groups ($\bar{x} \pm s$)

Group	Case	Cough Time (day)	Antipyretic (day)	Disappearance Time of Wet Rale (day)	Time of Hospitalization (day)
Study Group	80	3.20±0.29	1.40±0.20	4.58±1.25	5.60±1.60
Reference Group	80	5.79±0.35	3.28±0.19	7.09±2.03	7.88±2.10
t		3.58	5.30	6.41	9.05
P		<0.05	<0.05	<0.05	<0.05

Table 3: Comparison of the incidence for adverse reactions in two groups of children [n(%)]

Group	Case	Stomachache	Nausea and Vomiting	Gastrointestinal Reaction	Rash	Incidence of Adverse Reaction
Study Group	80	2	3	2	0	7(8.75)
Reference Group	80	3	2	2	2	9(11.25)
X ²						9.29
P						>0.05

with $P < 0.05$, which has statistical significance; the time of hospitalization in study group is less than reference group with $P < 0.05$, which has statistical significance.

Comparison of the incidence for adverse reactions in two groups of children

As shown in table 3, through comparing and recording the incidence of adverse reactions in children, it shows that there is no significant difference between the two groups with $P > 0.05$, which has no statistical significance.

DISCUSSION

Mycoplasma pneumoniae pneumonia is a relatively common pediatric disease, which has various clinical symptoms, including fever, headache, sore throat, cough and anorexia etc. After the antibody test for serum *Mycoplasma pneumoniae*, the results were positive and the shadow focus was seen through the chest X-ray examination. With the deepening of medical research, the inflammation of patients with *Mycoplasma pneumoniae* pneumonia is changed in different degrees as well as it leads to pulmonary complications of multi-systems. It also causes dysfunction of multiple organs, which will affect cardiovascular system, digestive system, urinary system, blood system and the nervous system etc. If the disease cannot be timely and effectively relieved, it will even threaten the children's safety (Hao 2017; Barkat and Mahmood 2018). So, children with *Mycoplasma pneumoniae* pneumonia are increasingly paid attention to and it is commonly believed that fever is an important

clinical symptom for the disease, which manifests constant heat and remittent fever with the problem of cough and stimulating dry cough. Although lung signs were less, through X-ray examination, it showed significant change (Yan 2016; Chuanlei *et al.*, 2018).

The clinical treatment for *Mycoplasma pneumoniae* pneumonia in children mainly uses macrolide antibiotics (fig. 3). The most common drugs are azithromycin and erythromycin. Erythromycin has high drug concentration and can improve the patient's clinical symptoms as soon as possible, which usually is the first choice. However, this drug is not ideal for the concentration of inflammatory cells and alveolar epithelial cells, which cannot maintain a good therapeutic effect on *Mycoplasma* in the lung (Gotoh *et al.*, 2015; Khan *et al.*, 2017). In addition, erythromycin is also more likely to cause function damage in liver and kidney as well as may lead to problems of gastrointestinal reaction.

Azithromycin is a new generation of macrolide antibiotics with better tissue osmosis. It can produce good antibacterial activity for *Mycoplasma*, which has significantly higher concentration of azithromycin in inflammatory cells than that in non-inflammatory cells. In addition, azithromycin has a longer half-life period, so the treatment is relatively short and therapeutic effect is better. When azithromycin is metabolized, it does not require the involvement of P450 cytochrome, which will not cause serious injury to the liver and kidney and the adverse reaction of the digestive tract is slight.

Through comparing the overall treatment efficiency of two groups of children, the research group had more significant advantages than control group: $P < 0.05$; through comparing the time of symptoms recovery and hospitalization, the time in research group was significantly less than control group: $P < 0.05$; in addition, through recording the rate of adverse reaction, the difference between the two groups was not significant: $P > 0.05$. It shows that the application of azithromycin in treatment of mycoplasma pneumoniae pneumonia in children has a better effect.

CONCLUSION

To sum up, the implementation of sequential therapy with azithromycin in children with mycoplasma pneumoniae pneumonia can achieve good therapeutic effect and there is no serious adverse reaction as well as less time to alleviate clinical symptoms. Therefore, it is of great value to popularize the application.

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