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Research Article

EVALUATION OF THE CLINICAL IMPACTS OF ERYTHROMYCIN AND AZITHROMYCIN IN THE TREATMENT OF THE CHILDREN SUFFERING FROM MYCOPLASMA PNEUMONIA

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Abstract:

Objective: To compare and evaluate the clinical impacts of erythromycin and azithromycin in the treatment of the children suffering from mycoplasma pneumonia (MPP).

Methodology: A sum of 122 children who were suffering from mycoplasma pneumonia and got admission in Bahawal Victoria Hospital Bahawalpur from December 2018 to November 2019 were the participants of this research work. We divided all the patients into two groups; observation group (OG) and control group (CG) with the application of the method of random number table, sixty-six patients in each group. The treatment of patients of the observation group was carried out with the use of azithromycin, where patients of the control group underwent treatment with erythromycin. Therapeutic impact, the prevalence of the adverse reactions and total duration of the disappearance of the symptoms were compared between the observation group and control group.

Results: Rate of the efficacy of the observation group was 98.040%, and that of the control group was 74.510%; this Difference was significant statistically ($X^2=7.1840$, $P=0.0070$). The rate of prevalence of adverse reactions in the patients of the observation group was 15.690%, much lower as compared to the patients of the control group (41.180%) ($X^2=6.3760$, $P=0.0020$). The time of disappearance of rale, cough, fever and X-ray shadow of the patients of observation group was much short as compared to the patients of the control group, and this disparity was also significant statistically ($P<0.050$).

Conclusion: Azithromycin is highly effective for the treatment of mycoplasma pneumonia among children as compared to the treatment with erythromycin. Azithromycin can further decrease the time for improvement in clinical signs and symptoms. There are only a few adverse reactions of this drug with high safety rate.

KEYWORDS: Azithromycin, Symptoms, Observation Group, Control Group, Mycoplasma Pneumonia, Prevalence.

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INTRODUCTION:

Mycoplasma Pneumonia (MPP) is a persistent complication of respiratory tract system. The leading cause of this complication is Mycoplasma pneumonia [1,2]. There are reports that some of the most important clinical manifestations of mycoplasma pneumonia are cough, sore throat, fever, headache, anorexia and expectoration. However, there are some acknowledged facts that the prevalence of mycoplasma pneumonia in the patients have an association with the age of patients and there are more atypical clinical signs and symptoms of mycoplasma pneumonia in a younger generation [3, 4]. In recent times, there is no clear clinical elaboration of the pathogenesis of mycoplasma pneumonia, but it is thought to have an association with the auto-immunity and humoral-immunity of children [5, 6]

The clinical treatment of the children suffering from mycoplasma pneumonia is mainly drug treatment. In recent times, the most frequently utilized drugs for the treatment of mycoplasma pneumonia among children are macrolide antibiotics. Some of the macrolide antibiotics are azithromycin and erythromycin. There is a better inhibitory impact of these drugs on mycoplasma [7, 8]. This current research work provided the comparison of the clinical effectiveness of azithromycin and erythromycin through the treatment of the children suffering from mycoplasma pneumonia, intending to give an authentic reference in the clinical field.

METHODOLOGY:

A sum of 122 children who were suffering from mycoplasma pneumonia and got admission in the Bahawal Victoria Hospital Bahawalpur, from December 2018 to November 2019 were the participants of this research work. All the children with a confirmed diagnosis of the mycoplasma pneumonia, getting no treatment of antibiotics and hormones, as well as present without any extra-pulmonary complication, were the participants of this research work. The division of the patients was carried out in the control group (CG) and observation group (OG) according to the method of random number table with sixty-six patients in each group. There were twenty-one males and forty-five female patients in the control group with a mean age of 7.90 ± 2.40 years. The range of the duration of mycoplasma pneumonia was from two to eleven days, with an average period of 7.16 ± 1.14 days. There were total thirty-one males and thirty-five female patients in the observation group with a range of age from two to fourteen years with a mean age of 8.30 ± 2.60 years. The range of duration of mycoplasma pneumonia was from three to twelve days in these patients with an average period of 7.85 ± 1.94 days. We found no significant

difference in the general data like gender and age of the patients in both groups ($P > 0.050$); therefore, the comparison of the results of the patients of both groups was carried out. The ethical committee of the hospital permitted to conduct this research work. We took the written consent of the members of the family of the recruited patients after describing them the purpose of this research work thoroughly.

We gave the conventional treatment to all the children for cough relief, heat-clearing, phlegm resolving, etc. The treatment of the patients of the control group was carried out with the utilization of erythromycin based on conventional therapy. Initially, the treatment of the patients carried out through intravenous injections of 20.0 mg/kg erythromycin and 200.0 mL of a solution of glucose, one time in a day. After stabilizing the condition of the disease, we administered the patients with oral doses of 100.0 mg/kg erythromycin for suspension two times in a day for fourteen days. The treatment of the patients of the observation group was carried out with the utilization of the azithromycin in combination with conventional therapy. Initially, treatment of the patients was carried out by intravenous injections of 100.0 mg/kg of azithromycin and 200.0 mL of a solution of glucose, one time in a day. After the stability of the condition of the disease, we administered the patients with oral doses of 5.0 mg/kg of azithromycin granules, two times a day for fourteen days.

We observed the clinical effectivity of the patients of both groups. The assessment standard of the curative impact of the treatment was as follows [9]; we considered the efficacy as significant if there was the disappearance in all the clinical symptoms, there was the disappearance in the vital signs and examination of the X-ray chest film showed no pneumonia symptoms. We also considered the treatment as effective if there was significant relief in clinical symptoms; there was substantial relief in vital signs and examination by the X-ray chest film showed symptoms of mild nature of pneumonia. We assessed the treatment as ineffective if there was no change in the clinical symptoms or aggravation. We calculated the percentage of the rate of effectivity. The total duration of the disappearance of the clinical signs of the patients of both groups was examined. We also noticed and recorded the rate of incidence of the adverse reactions in the patients of both groups. SPSS V.20 was in use for the statistical analysis of the collected information. We expressed the measurement data into averages, and standard deviations and processing of the measurement data were carried out with the utilization of T-test. We showed the counting data by percentages, and its

handling was carried out with the help of the X2 test. P-value of less than 0.050 was considered as significant.

The rate of effectivity of the patients of the observation group was 95.50%, significantly higher than the rate of effectivity of the patients of the control group (81.80%) ($P < 0.050$, Table-1).

RESULTS:

Table-I: Clinical efficacy between the two groups (%)

	Observation	Control	X2	P
Markedly effective	38(57.6)	26(39.4)	/	/
Effective	25(37.9)	28(42.4)		
Ineffective	3(4.5)	12(18.2)		
Total effective rate	63(95.5)	54(81.8)	7.184	0.007

Total duration for the reduction of fever, disappearance of cough, the removal of rale, disappearance of the X-ray shadow in the patients of observation group was much lower as compared to the patients of the control group, and these differences were significant statistically ($P < 0.050$, Table-2).

Table-II: Disappearance time of symptoms and signs between the two groups [(Mean \pm SD)]

Group	Observation group	Control group	t	P
Antipyretic time	2.88 \pm 1.25	5.72 \pm 1.54	9.218	0.001
Cough disappearance time	9.02 \pm 1.97	12.33 \pm 3.72	5.634	0.014
Disappearance time of rale	7.25 \pm 2.46	11.13 \pm 3.48	6.517	0.005
Disappearance time of X-ray shadow	3.22 \pm 1.01	6.98 \pm 1.56	13.372	0

The rate of prevalence of adverse reactions in the patients of the observation group was 10.60%, significantly less than the patients present in the control group (25%) ($P < 0.050$, Table-3).

Table-III: Occurrence of adverse reactions between the two groups during treatment (%)

	Observation	Control	X2	P
Local pain	2(3)	7(10.6)	/	/
Rash	1(1.5)	4(6.1)		
Gastrointestinal reaction	4(6.1)	5(7.6)		
Liver function damage	0(0)	1(1.5)		
Incidence of adverse reactions	7(10.6)	17(25.8)	6.376	0.002

DISCUSSION:

Mycoplasma Pneumonia (MPP) is an infection mainly caused by mycoplasma pneumonia among children. One research work stated that approximately 9.60% to 66.70% of infections of lungs is the outcome of the Mycoplasma pneumonia [10]. Mycoplasma pneumonia among children is a prevalent disease of the respiratory tract, and there is an increasing tendency of the rate of incidence of mycoplasma pneumonia in current few years [11, 12]. Considering that children suffering from mycoplasma pneumonia are in their

stage of physical improvement and development, so, there should be a selection of the appropriate antibiotics in the treatment course. The main drugs for the treatment of mycoplasma pneumonia in children are macrolide antibiotics. A most common medication for the treatment of mycoplasma pneumonia among children is erythromycin, and it is also the most commonly used medicine in grassroots hospitals [13]. Erythromycin can effectively lessen the clinical symptoms of the complications in children, decreases the lung shadow and reduced the disease course.

However, one research work stated that there is the instability of erythromycin in the acidic environment and natural to have issues like decomposition, which will cause the adverse GI (Gastrointestinal) reactions [14]. Furthermore, there is always a hefty dose of erythromycin with prolonged infusion and long disease course. Intravenous injections for the long term can be the reason for pain on phlebitis and puncture side, and the majority of the children cannot adhere to the process of treatment, leading to adverse compliance to medication. One among the new macrolide antibiotic is the azithromycin, which can block the protein synthesis with a full combination of the ribosomal subunits of pathogens to attain the aim of anti-microbial activity. In the treatment of the children suffering from mycoplasma pneumonia, there are following advantage of azithromycin [15-17];

1. This drug has a vast spectrum of the anti-microbial agents as it can restrict and mitigate the majority of gram-negative and positive bacteria,
2. The tissue permeability of this drug is excellent and it can easily reach the site of infection and increase the concentration of the drug at that very location,
3. The half-life of this drug is very long about more than forty days;
4. The stability level of this drug is three hundred times higher than the erythromycin,
5. It reduced the amount of medication and improved the compliance of drugs among children.

In this current research work, we analyzed and compared the clinical impacts of azithromycin and erythromycin on the children suffering from mycoplasma pneumonia. The findings of this research work showed that the total rate of effectivity of the patients of observation group was 95.50%, which was much higher than the patients present in the control group (81.80%), These findings were similar with the results of a study of Tang [19], in which he selected ninety children suffering from mycoplasma pneumonia and divided these children into research and control group. The treatment of these patients was carried out with intravenous infusion of sequential treatment of azithromycin and erythromycin correspondingly. The findings stated that total disappearance duration of rale and cough in the patients of the research group was much less as compared to the patients of the control group which was also proved by this current research work. In this present research work, findings displayed that the time of disappearance of cough, fever, and rale and X-ray shadow of the patients of observation group was much lower as compared to the patients of the control group, proposing that there was a more significant impact of treatment by azithromycin.

Furthermore, the rate of prevalence of adverse reactions in the patients of observation group was much lower as compared to the patients of the control group, which elaborated that treatment by azithromycin was highly secure, consistent with the findings of research work conducted in the past [20]. The reason behind these benefits was that there was the highly stable structure of azithromycin and the half-life of this drug was very long which was much helpful to decrease the symptoms of the disease in the process of treatment.

CONCLUSION:

The findings of this research work concluded that the rate of effectivity of azithromycin for the treatment of the children suffering from mycoplasma pneumonia is higher as compared to the treatment by using erythromycin. This drug can reduce the total duration of the disappearance of clinical signs and symptoms as well as a low amount of adverse reactions with high safety. It has much worth for application in the clinical field for the treatment of the children suffering from mycoplasma pneumonia.

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