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THE EFFECTIVENESS OF AZITHROMYCIN IN TREATING ACUTE BRONCHIOLITIS IN INFANTS ADMITTED TO THE PEDIATRIC DEPARTMENT AT LATAKIA UNIVERSITY HOSPITAL IN LATAKIA

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ABSTRACT

Background: Acute Bronchiolitis is the most common viral infection of the lower respiratory tract in infants. It is generally a self-limiting condition and can be treated conservatively at home. However, there are hypotheses that Azityromycin may have a role in treatment. **Objective:** The main objective is to evaluate the effect of Azithromycin on length of hospital stay and duration of oxygen requirement in cases acute bronchiolitis. **Patients and Methods:** Analytic comparative study (prospective) during the period from March 2024 to March 2025 at Latakia University Hospital, the study included all infants admitted to the pediatic department with complaints of acute bronchiolitis, treated or not treated with Azithromycin who met the inclusion criteria for the study. Length of hospital stay, duration of oxygen requirement and clinical improvement were compared between patients treated with Azithromycin at a dose of 10mg/kg daily for 5 days and those not treated with Azithromycin under similar clinical, laboratory and therapeutic conditions. **Results:** The average length of hospital stay was similar in both study groups (p:0.3) and there was no significant difference in oxygen requirements between the two groups (p:0.2). **Conclusions:** Azithromycin did not improve the main clinical outcomes of infants with acute bronchiolitis in terms of shortening the duration of hospitalization and reducing the duration of oxygen requirement.

KEYWORDS: Acute bronchiolitis. Azithromycin. Respiratory syncytial virus, Infants, Macrolides.

INTRODUCTION

Acute bronchiolitis is a clinical syndrome of respiratory distress that occurs in young children less than two years of age[1] it is characterized by acute inflammation, edema, and increased mucus production after an acute viral infection.[2] Respiratory syncytial virus is the most common viral causative agent.[6]

Acute bronchiolitis is a major risk factor for recurrent wheezing and asthma in childhood[3] and is the leading cause of hospitalization in infants, accounting for more than 3 million hospitalizations annually worldwide.[5]

Azithromycin is a safe and well-tolerated macrolide antibiotic with antiviral, anti-inflammatory, and immunomodulatory effects[6] it is considered the most tissue-penetrating macrolide drug, as it accumulates specifically in phagocytes that carry it to the site of inflammation.[7] It is also reduces the bacterial load in the nasopharynx and the risk of acute lower respiratory tract infections.[8]

Over the past decades, the treatment of acute bronchiolitis has relied on supportive therapy with adequate oxygen and ventilation, nebulization of hypertonic saline, hydration and artificial respiration in severe cases.[5][9]

Antibiotics are rarely recommended for the treatment of acute bronchiolitis unless the disease is severe or a bacterial infection is suspected.[10]

However, semi-synthetic macrolides e.g Azithromycin, Clarithromycin which have immunomodulatory, and/or antimicrobial properties and antiviral effects, which may be useful for children with bronchiolitis with high bacterial load rates in the nasopharynx.[11][12]

Thus not surprisingly, results from the existing RCTs differed in the effect on reducing length of hospitalisation and o2 requirement. A Turkish[13] trial reported improved clinical outcomes. In comparison a European[14] and a Brazilian (2) trials showed no improvement.

This incidence of secondary bacterial infections in infants with RSV-positive acute respiratory infections ranges from 3.5 to 31%.[15][16][17] This incidence is higher

in poorer communities and /or in those with more severe disease.[18][19]

Macrolides appear to inhibit the production of interleukin IL6 and IL8 and reduce neutrophilic airway inflammation.[20] Because acute bronchiolitis is characterized by a strong neatrophilic airway response several small trials have used this basis to test the efficacy of macrolides in treating this disease.[21],[22]

MATERIALS AND METHODS

The research sample included 90 infants admitted to the pediatric department at Latakia University Hospital with complaints of acute bronchiolitis treated or not treated with Azithromycin, aged less than 24 months during the period from March 2024 to March 2025.

Upon admission, all children underwent a thorough examination to exclude children with chronic cardiopulmonary disorder, congenital or acquired immunodeficiency, or neuromuscular disease.

Detailed information included: age, sex, clinical symptoms, body temperature on admission, respiratory examination findings, duration of hospitalization, duration of oxygen requirement, family history of asthma, passive smoking, laboratory tests upon admission.

The clinical diagnosis of RSV LRTD was defined by a first attack of dyspnea and one or more symptoms compatible with lower respiratory tract infection including body temperature greater than 37.5 c, coughing, wheezing (audible with or without stethoscope) and crackles on pulmonary auscultation.

Inclusion criteria: children admitted to the pediatric department with a diagnosis of acute bronchiolitis less than 24 months of age during the study period, treated and untreated with Azithromycin.

EXCLUSION CRITERIA

1- Children diagnosis with chronic cardiopulmonary disorder, congenital or acquired immunodeficiency or neuromuscular disease.
2- Any restrictions on the use of oral Azithromycin such as gastrointestinal disorders, liver disorders, or severe respiratory distress.
3- History of prematurity or other birth complications.
4- Children with concomitant bacterial infection this depends on the clinical assessment of the severity of the disease, in addition to laboratory and radiological examinations.
5- Macrolide therapy was prescribed by the treating physician due to clinical and radiological manifestations consistent with a diagnosis of chlamydia.
6- Children treated with antibiotics within a week of hospitalization.

Statistical analysis

Study design: Analytic comparative study (prospective).

The chi-square or Fisher exact test was used to study the relationships between categorical variables. The Independent T student test was employed to compare the mean differences between the two groups. All variables were tested using univariate regression, and the statistically significant variables were then entered into a multivariate analysis equation. Results were considered significant if the p-value was less than 5%. IBM SPSS Statistics software was used to compute the statistiiocal parameters and analyze the results.

RESULTS

The research sample included 90 children admitted to the pediatric department at Latakia University Hospital with a diagnosis of acute bronchiolitis, treated or not treated with Azithromycin.

The childrens ages ranged from 1 to 20 months with a mean of 4.67±3.1 days, with no statistically significant differences in the mean values for age.

The duration of oxygen requirement ranged from 1 to 4 days with an average of 2.41±0.9 days with no statistically significant differences (p:0.2) Table 1.

The length of hospital stay ranged from 1 to 9 days with an average of 4.56±2.1 days with no statistically significant differences (p:0.3) Table 2.

57.8% of the studied broadcast sample were males and 42.2% were females, with no statistically significant differences between the two research groups in terms of gender (p:0.1).

The most common clinical symptoms reported was cough (96.7%), followed by dyspnea(40%), loss of appetite and fever (38.9%).

During respiratory examination upon admission 92.2% of the studied cases had tachypnea, 73.3% wheezing, 63.3% use of accessory respirstory muscles, 35.6% rales.

Table 1: Mean values for the duration of oxygen requirement in a sample of 90 children according to the drug treatment used.

The duration of o2 requirement(day) Mean ± SD	With AZT	Without AZT	P-value
	2.60±0.8	2.25±1	0.2

Table 2: Mean hospitalization duration values in a sample of 90 children according to the drug treatment used.

Hospitalization duration (day) Mean ± SD	With AZT	Without AZT	P-value
	4.77±2.2	4.40±1.7	0.3

Table 3:

Variable	Current study	Rosa	Martin	Gabrielle	Pinto
Duration of oxygen requirement					
Azithromycin	2.60±0.8	-------	3.8±0.4	1.5	4(2-6)
Control	2.25±1		3.4	1.75	4(3-6)
P-value	0.2		0.3	0.7	0.4

We note that all previous studies agree with the current study in that there are no positive effects of applying azithromycin treatment with regard to reducing the duration of oxygen need in patients with acute bronchiolitis.

Table 4:

	current study	Rosa	Martin	Gabrielle	Pinto
Duration of hospitalization					
Azithromycin	4.77±2.2		5.5	2.24	5(3-7)
control	4.40±1.7	There is moderate-quality evidence that azithromycin may reduce the duration of hospitalization. The duration of hospitalization was 0.27 days shorter in the azithromycin group .	5.8	2.4	5(3-7)
P-value	0.3		0.3	0.6	0.3

We note that all previous studies egree with the current study in that there are no positive effects of applying azithromycin treatment with regard to reducing the duration of hospitalization in patients with acute bronchiolitis.

DISCUSSION

The number of acute bronchiolitis cases in the current study was 90, and 40 cases received Azithromycin (44.4%). This percentage is similar to the pinto study in Brazil[2], where AZT was used in 47.8% of cases (184 cases), the Gabrielle study in Australia[23] where AZT was used in 51.54% of cases studied (97 cases), and the Martin study in Netherlands[24] where AZT was used in 45.07% of cases (71 cases).

The number of males was 52 cases and females 38 cases which is consistent with the study of Pinto, Martin and Gabrielle in terms of the higher frequency of males.

The current study included infants under 24 months of age, which is consistent with the study of Martin. However, the study of Pinto included only infants less than 12 months, and the study of Gabrielle included less than 18 months.

In the current study, we found that cough was the most frequent clinical symptom with 97.7% of cases. This is consistent with the study of Martin (97.18%) and Gabrielle (98.9%).

Azithromycin treatment was applied in the current study at a dose of 10mg/kg daily for 5 days. In the Pinto study it was applied for 7 days, and for 3 days in the study of Martin. A single dose of 30 mg/kg was used in thestudy of Gabrielle.

There were no statistically significant differences between patients according to AZT application with respect to gender (p:0.1) and age (p:0.09).

We observed statistically significant differences between the two research groups regarding the mean values of platelets (p:0.007) which were lower in the cases treated

with Azithromycin, and the white blood cell count was higher in them. In contrast to the study of Martin we did not observe these statistical differences.

There were no statistically significant differences between the two research groups regarding the presence of a family history of asthma (p:0.4). This is consistent with the study of Martin where no significant differences were observed unlike the study of Pinto.

Our results can be explained as follows

Azithromycin affects rhinoviruses, coronaviruses, and influenza A in particular, which are known causes of acute brinchiolitis. However, it is known that the majority of acute bronchiolitis (50-80%) are caused by the respiratory syncytial virus, and the mechanism of Azithromycin's effect on this virus remains unproven.

It is well known that the treatment of infants with acute bronchiolitis varies according to hospital protocols and, more recently, has become a matter of personal pediatrician decision, as was the case in this study. However, all patients in our study were treated with bronchodilators and systemic corticosteroids, which minimizes the potential confounding factor resulting from treatment differences.

Inflammatory markers such as ILS or cellular counts in the respiratory secretions were not measured, but even a positive association between inflammatory markers and macrolide use would not be clinically relevant based in our negative findings.

Limitations

1- The causative agent has not been identified in patients with acute bronchiolitis due to the lack of possible laboratory capabilities.
2- The study was limited to one semester because the study period was one year.
3- A large number of causes were excluded due to indiscriminate early use of antibiotics**.**

CONCLUSIONS

Azithromycin did not improve the main clinical outcomes in a sample of infants hospitalized with acute bronchiolitis, in term of shortening the duration of hospitalization and reducing the duration of oxygen requirement. Therefore, Azithromycin should not be given to patients with acute bronchiolitis because it does not provide any benefit and its overuse increases antibiotic resistance in general.

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