AZITHROMYCIN AND CO-AMOXICLAV AT DIFFERENT DOSAGES HAVE BEEN PROMOTED FOR TREATING CHILDREN WITH LOWER RESPIRATORY TRACT INFECTIONS

Dr. Anupriya
Assistant Professor, Department of Paediatrics, JR Medical College and Hospital, Villupuram Tk, Tamilnadu, India

Corresponding Author: Dr. Anupriya

Abstract

The effectiveness of azithromycin in treating acute lower respiratory tract infections (LRTI) was evaluated through a comparison study with co-amoxiclav. Depending on their weight, the children received either azithromycin (10 mg/kg/day) or co-amoxiclav (45/11.25 mg/kg/day). Co-amoxiclav treatment cured 87 percent, whereas azithromycin treatment cured 91 percent. In view of P=0.55, we conclude that there are no statistically significant differences between the two groups. The drug, however, caused significantly fewer adverse reactions in patients, most of which occurred in the gastrointestinal system. Patients who received azithromycin and co-amoxiclav between 25 and 30 days after treatment showed improvement by their third visit. The benefits of azithromycin are greater for children with LRTI than those of coamoxiclav because it is safe, effective, and convenient.

Keywords: Azithromycin, Co-amoxiclav, Pediatric LRTI, Antibiotic therapy and Adverse events

Introduction

Unlike erythromycin, zithromycin contains a semisynthetic ring in its 9A position instead of erythromycin (1). In comparison with erythromycin, azithromycin displays a better pharmacokinetic profile due to its higher tissue concentration, antimicrobial spectrum, and serum half-life. Azthromycin has several benefits over erythromycin, including a superior pharmacokinetic profile, greater stability, and better absorption (2). In addition to its antimicrobial efficacy against Gram positive bacteria, azithromycin also shares the same properties as erythromycin. Although erythromycin has enhanced Gram-negative bacteria's in vitro activity, it does not have a sufficiently high impact on Gram-positive bacteria (3). In addition to preventing infection caused by Haemophilus influenza, Streptococcus pneumoniae, Moraxella catarrhalis, Mycoplasma pneumonia, and Chlamydia pneumonia, it also protects against other bacterial pathogens. The drug co-amoxiclav is commonly prescribed to children for LRTIs (4,5). It is difficult to adhere to this regimen due to the three times per day administration required over ten days. When used once a day and over three days, azithromycin pharmacokinetics are satisfactory. In addition to helping children and those in ambulatory care, this is very useful. For the purpose of establishing whether the treatment of acute LRTI by azithromycin (3 days) or co-amoxiclav (10 days) differs in terms of effectiveness, safety, and tolerability, children were treated with azithromycin for 3 days and co-amoxiclav for 10 days. In this study, researchers utilized the double-blind, double-dummy design for the first time.

Materials and methodology

Study design

Trial conducted in a multicentric, randomized, double-blind, double-dummy environment comparing azithromycin versus coamoxiclav on children with acute LRTI.

Patients

A total of 12 participants acquired LRTI in the community between the ages of 3 months and 12 years were enrolled in this study. The diagnosis of LRTI was made based on respiratory symptoms, a positive chest radiograph, and clinical evidence, including rectalor oral temperature of 380 C,

coughing, leukocytosis of ten thousand cells/mm3, band formations, grates, rhonchi, or consolidation on physical examination. The study included patients who had LRTI for longer than a week, weighed less than 40 kg, received parenteral therapy, had malformations of the respiratory system, aspiration of foreign bodies, cystic fibrosis, bronchopulmonary dysplasia, cardiac diseases congenital and acquired, severe retardation, had previously participated in this study, or were taking ergotamine or digitalis glycosides (6,7).

Study drug

The study consisted of three arms, each assigned 3 days' suspension of azithromycin (10mg/kg/24h), third day suspension of co-amoxiclav (45/11.25mg/kg/24h). In order to conduct the study blindly, co-amoxiclav placebo suspension tds was applied to the azithromycin group for 10 days. Co-amoxiclav suspensions were given to the patients for the first three days followed by azithromycin placebo suspensions. We randomly assigned patients to six combinations of azithromycin and co-amoxiclav active/placebo (8).

Clinical evaluation

First, we observed the clinical presentation and signs of LRTI. There will be a second visit on days 3 to 5, a third visit on days 10 to 13, and a fourth visit on days 25 to 30 in the upcoming weeks. Our follow-ups included assessments of medication compliance, adverse events, comorbid medications, and adverse events. An evaluation of hemoglobin, haematocrit, platelet count, C reactive protein, and white blood cell count was conducted in the first and fourth visits. Measurements of transcutaneous oxygen saturation were conducted during the initial visit. First and fourth visits were conducted for chest radiographs. On visits 2, 3, and 4, the researcher stated that the patient had been cured, or that he had made clinical progress or not. Successful treatment (9) outcomes were defined as the absence of signs and symptoms over time, those who improved but were not completely symptom free, and those who did not change or worsened. Patients were considered failures when the treating physician had to substitute another treatment for the study medication. Every morning and evening, parents took two measurements of their children's core body temperature rectally. Following two days of fever-free temperatures, a patient was considered fever-free when his temperature reached 37.5 degrees C. Following one month from his last visit, the parents were contacted by phone. It was necessary to verify the outcome of each patient individually in order to overcome the treatment code.

Safety

These adverse events were categorized as mild, moderate, severe, and life-threatening on visits 2, 3, and 4. Potentialities were recorded, probabilities were recorded, certainties were recorded, likelihoods weren't necessarily recorded, and certainties weren't necessarily recorded either.

Compliance

During the course of the study, parents were asked to fill out diary cards for their children detailing their medication dosages. An individual who does not comply with the active medication requirement over 80% was deemed to be non-compliant.

Bacteriology and virology

Cultures were performed on blood samples. Expectoration and sputum culture were both performed. A standard procedure was followed for the processing of the cultures. At admission and for 2530 days following admission, mucus samples were collected via an extraction device in the nasopharynx. By using immunofluorescence techniques, these viruses and cytomegaloviruses were directly tested, and the isolates of these viruses were then used to test other viruses, such as RSV, adenoviruses, influenza A and B, and parainfluenza viruses. M. M. pneumoniae and C. pneumoniae were processed using PCR. However, serological testing of RSV, parainfluenza virus 13, adenovirus, influenza virus A and B, M. pneumonia, and C. pneumoniae antibody presence in serum was done at approximate 2530 days after admission. According to the report, serological tests can detect a

fourfold increase in specific antibodies, such as IgA, IgM and IgG, using complement fixation tests, or specific antibodies using enzyme immunoassays.

Statistical analysis

We sought to answer the following question: Has a cure been obtained during visit 3 (thirty to thirteen days)? For an equivalence test to be valid, the lower limit of the 90 percent confidence interval for the differences in proportions of patients who achieved the endpoint (atzithromycin plus co-amoxiclav) must be more than -10 percent. There were 95 percent cure or improvement rates among the patients, so 118 patients demonstrated equivalence with 80 percent potency. A Fisher test was used to make the percentage comparison. An analysis using Mann-Whitney tests was conducted to compare the day when fever was gone and the number of adverse events per patient. The P0.05 (two sided) was the set statistical significance.

Results

A total of 82 randomly selected patients participated in this study, 34 of them (41%) being from the university hospital. As a result of not meeting the requirements, three patients were excluded. A patient's informed consent was revoked by other parents who had informed consent from one parent. Study results were also conducted on the remaining 78 patients (78). It was estimated that 41 37 patients received azithromycin and co-amoxiclav. Table 1 shows that there were no significant differences between the two groups. Median age for those taking azithromycin was 3.8, while it was 2.7 for those taking co-amoxiclav. There was not much difference in this disparity.

It was not possible to meet with three patients on the third visit. They were content with their conditions and telephonic calls indicated that they had improved on the second visit. As a result, their primary endpoint was clinical improvement.

Table 1: Patient Characteristics at Baseline

Characteristics	Azithromycin (n = 41)	Co-amoxiclav (n = 41)
Intimacy		
He is a male	22 (54%)	19 (46%)
The female gender	19 (46%)	22 (54%)
Years of age (in years)		
Range (median)	3.8 (0.9–12.6)	2.7 (1.0–10.9)
Asymptomatic presentation		
A coughing fit	30 (73%)	28 (68%)
The feeling of dyspnea	6 (15%)	5 (12%)
Pseudosputum	4 (10%)	3 (7%)
Fieber	31 (76%)	28 (68%)
The rate of respiration	36 (87%)	34 (83%)
It is Rhonchi.	21 (51%)	19 (46%)
An indication of consolidation		
Currently	18 (44%)	15 (37%)
A brief history of your health		
Presenting days of illness	3.2 (1–10)	3.1 (2–9)
Last two weeks' history of UTI	5 (12%)	4 (10%)
Atopic dermatitis	12 (29%)	10 (24%)
Recent pneumonia	4 (10%)	3 (7%)
X-ray of the chest		
An abnormal chest radiograph is present	48 (117%)	41 (103%)
Amounts in the laboratory		
(WBC count of 10^9/L)	14.7 (10–18)	16.4 (12–20)

Table 2: Clinical response

Effects on the bodya	Azithromycin (n = 41)	Co-amoxiclav (n = 41)
Three visits		
Treatment	31 (75%)	29 (70%)
Enhancements	6 (16%)	7 (17%)
Failing	4 (9%)	5 (13%)
Fourth visit		
Treatment	36 (88%)	34 (84%)
The system has been improved	1 (2%)	1 (2%)
Failing	4 (10%)	5 (14%)

According to Table 2, azithromycin and co-amoxiclav cured 91 and 87 percent of patients with infection at visit 3 (1013 days). A clinical outcome assessment was not conducted for two patients on the third visit. The P-value at visit 3 was 0.55 for the azithromycin group, and it was -6 to 14 for the co-amoxiclav group.

The majority of azithromycin respondents are nonresponders: two were administered both macrolides and azithromycin after being infected with bacteria, e.g., Mycoplasma pneumoniae, so they were administered both antibiotics. Symptoms such as nausea and vomiting were treated intravenously. A fever was reported by two patients on day 9 after they had rejected oral medication. In three patients, none of the interventions were successful: three needed intravenous treatment, one had an effusion, one had a fever on day 9 and one did not improve by day 10. After being dissatisfied with the patient's treatment, his mother changed his medication type a few days later. As compared with the younger children, the azithromycin and co-amoxiclav groups did not show statistically significant clinical improvements at visit 3 and P=1.00.

The majority of patients who received azithromycin treatment over a period of 25-30 days were cured or improved (data in Table 2). Following a recent visit, a patient receiving azithromycin developed respiratory tract infection and bronchial barricade.

A total of 96 diary cards were available for the patients with existing fever in visit 3 and 74 for those who improved/cured in visit 3. In general, it took 3 days for the azithromycin (n=39) to take effect, after which they returned to normal temperature. In a study of 35 patients, co-amoxiclav was prescribed for 2 days on average. It is not significant that the P value is 0.08.

The fourth visit resulted in the second radiograph of the chest being taken on 84 (76) patients. In terms of chest radiographs, there was no significant difference between the two treatment groups. Visit 3-cured patients from both groups did not appear to have improved on chest radiographs taken during visit 4. A comparison of chest radiographs with and without consolidation showed no difference in clinical outcome.

Measurement criteria for compliance are based on 94 (85) diary cards. Approximately 30 percent of a patient's co-amoxiclav dose had been administered. During her second visit, she was now in a better clinical condition than she was after the first two days of treatment, and her only complaint was coughing. She had a healed clinical picture by visit four. All other cases were also satisfactorily compliant.

In the study, only patients who had received one dose of the study medication were examined for safety. As a result of one patient withdrawing informed consent, the remaining 81 patients could not receive study medication. Our study reported 56 percent (33/59) of azithromycin's adverse events and 71 percent (41/58) of co-amoxiclav's adverse events (P=0.13). According to Azithromycin data, there were 48 adverse events, while Coamoxiclav reported 70. Significant differences are indicated by a P value of 0.04. Approximately 24% and 47% of the negative events in the azithromycin and

co-amoxiclav groups have been linked to the study medication. As co-amoxiclav substantially increased the number of gastrointestinal protests (43% and 19%, respectively), the significant difference can largely be attributed to that medication. There were also significant differences in adverse events (rash, fever) between the two groups. It has not been reported that the study medication has caused any serious side effects. Approximately 55 percent of the pathogens were present in both groups. Atypical, mixed, viral and bacterial microorganisms were equally prevalent among the two groups.

Discussion

According to the results of the present study, azithromycin suspension (10mg/kg/24 h) administered as a single dose daily for three days was equally effective as co-amoxiclav suspension (45/11.25mg/kg/24 h) administered three times daily for ten days when treating acute lower respiratory tract infections (LRTIs). Alternatives to coamoxiclav, such as azithromycin, have a reduced risk of adverse events. The number of GI complaints was highly discrepant (10). There was a similarity between our study and previous studies in terms of clinical outcomes. In this study, azithromycin is shown to be equally effective as more complicated co-amoxiclav regimens for treating children with LRTI. Studies have shown rates of negative events ranging from 6-27% [5-10] in children treated with azithromycin. Thus, there is little evidence that azithromycin is harmful to children. Among children receiving azithromycin, two-fourths experienced adverse reactions. According to a previous research study, co-amoxiclav was associated with 11 to 31 adverse events. The high rate of such events reported by the co-amoxiclav group (47%), however, does not have any obvious explanation. Since it is difficult to determine the pathogen responsible for pediatric LRTIs, they cannot easily be treated and diagnosed empirically. Because azithromycin is capable of killing a broad spectrum of bacteria, this new macrolide is effective and powerful in treating children with LRTI. Moreover, azithromycin is attractive because its treatment courses and dosages are not time-consuming.

Conclusion

When azithromycin is given over three days for the treatment of acute lower respiratory tract infections (LRTIs), it is more effective than when co-amoxiclav is given for 10 days. Both groups' patients also had similar clinical outcomes, and most were cured or had improved long-term outcomes. As well as having fewer side effects than co-amoxiclav, azithromycin also had fewer gastrointestinal side effects than co-amoxiclav. When it comes to azithromycin, the daily dose schedule and shortened alpha period are significant advantages, especially when it comes to pediatric patients, because they are likely to have difficulty adhering to long-term treatment plans. Children with LRTI are recommended to receive azithromycin, despite the fact that there is no significant difference in the clinical course between the two groups. According to the findings, azithromycin could be a more convenient and effective treatment for LRTI in children than co-amoxiclav.

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