

COMPARISON OF EFFICACY OF AMOXICILLIN CLAVULANATE AND LEVOFLOXACIN IN TREATMENT OF ACUTE BACTERIAL SINUSITIS

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ABSTRACT

Objective: To compare the efficacy of Amoxicillin-Clavulanate and Levofloxacin in the treatment of acute bacterial rhinosinusitis in terms of complete resolution of signs and symptoms.

Material and Methods: This was a Randomized control study conducted at the ENT Department of Ayub Medical Institute (AMI), Abbottabad and Khyber Teaching Hospital (KTH), Peshawar from January 2014 to June 2014. A total of 360 patients included in this study were divided in to two groups by non probability technique. Group A included 180 patients who received Amoxicillin-Clavulanate while Group B received levofloxacin for 10 days. Patients were reevaluated for complete resolution of signs and symptoms on 11th day.

Results: A total of 360 patients were included with a mean age of 31.16 ± 12.51 years. On the 11th day a total of 317 (88.1%) patients had complete resolution of symptoms and signs including 161 (89.44%) of group A and 156 (86.66%) of group B. There was no statistically significant difference in the frequency of patients and duration of resolution of signs and symptoms between the two groups.

Conclusion: There was no significant difference in the frequency of patients who had complete resolution of signs and symptoms between the Amoxicillin-Clavulanate and Levofloxacin receiving patients; hence the two drugs were similar in efficacy.

Key Words: Sinusitis, Amoxicillin-Clavulanate, Levofloxacin, efficacy.

INTRODUCTION

Acute rhinosinusitis (ARS) is defined as an acute viral or bacterial infection characterized by inflammation of the mucosa of the nose and paranasal sinuses.¹ Although most cases of acute rhinosinusitis are viral in origin, acute bacterial rhinosinusitis is also a fairly common occurrence. Even though most patients with acute rhinosinusitis recover promptly without antibiotic therapy, it should be considered in patients with prolonged or more severe symptoms. Due to its evolution, rhinosinusitis is considered to be acute (viral or non-viral origin) if it lasts less than 12 weeks, chronic when it exceeds this time period and recurrent acute when three or more acute episodes are suffered in one year. Rhinosinusitis symptoms resolve spontaneously in 40% of the patients without any treatment. However, medical treatment is indicated to provide symptomatic relief, accelerate the resolution of

the clinical picture, prevent possible complications and avoid evolution to chronicity.² signs and symptoms of acute bacterial rhinosinusitis including nasal blockage or stuffiness, mucopurulent nasal discharge or postnasal drip, facial pain, headache, and reduction in/loss of smell or perception of bad smell (cacosmia). Signs include erythematous nasal turbinate, mucopurulent nasal discharge of meatus and post nasal drip.^{1,2,3}

Antimicrobial agents and topical nasal corticosteroids (used alone or in combination with antimicrobial agents) are the treatments that have demonstrated therapeutic utility in rigorous and controlled clinical trials.^{3,4,5} In mild acute rhinosinusitis without previous antibiotic therapy, the treatment of choice is amoxicillin-clavulanate or cefadroxil, while when it is moderate or mild in patients previously treated with antibiotics, levofloxacin or moxifloxacin are preferable and are good alternatives, while in the severe forms, third generation cephalosporins, such as cefotaxime or ceftriaxone or cefixime are indicated.^{6,7,8} Clinical data regarding success rate of amoxicillin/clavulanate is 96.7%.⁹ The success rate of levofloxacin in the treatment of ABRS is 88.4% in one study.¹⁰ The aim of study was to compare the efficacy of oral amoxicillin-clavulanate with levofloxacin

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in the treatment of acute bacterial rhinosinusitis in adult patients in order to generate our own data.

MATERIAL AND METHODS

This Randomized control study conducted at the ENT Department of Ayub Medical Institute (AMI), Abbotabad and Khyber Teaching Hospital (KTH), Peshawar from January 2014 to June 2014. Informed consent was obtained from all patients as a part of ethical practice. The inclusion criteria was patients of either sex above 15 years, with signs and symptoms of acute bacterial rhinosinusitis including nasal blockage or stuffiness, mucopurulent nasal discharge or postnasal drip, facial pain, headache, and reduction in/loss of smell or perception of bad smell (cacosmia). Signs include erythematous nasal turbinate, mucopurulent nasal discharge of meatus and post nasal drip. The exclusion criteria were patients who were already on antibiotics, diabetic, pregnant and lactating patients and those with history of sinus or nasal surgery. Patients allergic to either Amoxicillin-clavulanate or Levofloxacin were also excluded. The registered subjects were randomly allocated into two groups:

Group A: included patients who received Amoxicillin-clavulanate 1gm b.d for 10 days (n=180).

Group B: included patients who received Levofloxacin 500mg o.d for 10 days. (n=180).

Demographic information like name, age and gender were obtained. Patients of more than 15 years of age were included based on the presence of any four or more symptoms and two or more signs described in inclusion criteria. Patients were excluded by history if they were already on any antibiotics, if non-compliant, if have any drug allergy or if any previous nasal surgery. Blood sugar was checked in suspected diabetic patients. Pregnant women were excluded by history and urine pregnancy test, if required. All patients were given Xylometazoline nasal spray along with nasal decongestant and steam inhalation in the same dosage and duration. Group A received oral Amoxicillin-clavulanate 1 g every 12 hours for 10 days while Group B received oral Levofloxacin 500 mg once daily for 10 days. All the patients were kept under strict surveillance and side effects if any, were noted. Follow up was ensured by taking telephone contacts. All the patients were assessed for resolution of signs and symptoms. Symptoms and signs were recorded at visit one before the start of antibiotics and on 11th day after completion of treatment.

Data was collected on the designed proforma. The data was stored and analyzed in SPSS version 11. Mean and standard deviation was calculated for age

and duration of sign and symptoms. Frequency and % age were calculated for gender and efficacy. Chi-Square test was used to determine the difference in efficacy in two groups. P value of <0.05 was considered as significant.

RESULTS

A total of 360 patients were included in the study. They were randomized into two groups, Group A & B with 180 patients in each. The age of patients varied from 15 to 58 years with mean age was 31.16 ± 12.51 years. The two groups did not differ statistically with respect to age distribution with P-value = 0.065 (Table 1). In Group A there were 97 (53.8%) males and 83 (46.2%) females while Group B has 93 (51.6%) males and 87

Table 1: Various Parameters between the two groups

Variables	Group A (n=180)	Group B (n=180)	P-value
Sex (No.)			
Male	97 (53.8%)	93 (51.6%)	0.673
Female	83 (46.2%)	87 (48.4%)	
Mean age (years)			
	29.94	32.37	0.065
Resolution fo signs and symptoms (%)			
	161(89.4%)	156(86.6%)	0.416
Mean Duration of Resolution (Days)			
	5.706	5.967	0.134

Resolution of signs and symptoms

■ Yes
■ No

Pies show percents



Figure 1: Overall resolution of signs & symptoms

(48.4%) with P-value = 0.673. No statistically significant difference was noted between the two groups for age and sex of patients. (Table 1)

The common symptom was nasal discharge (98.3%) followed by nasal obstruction or stuffiness, postnasal drip, headache, facial pain, reduced smell and cacosmia. Erythematous nasal turbinates and mucopurulent nasal discharge in meatus was seen in all 360 (100%) patients while post nasal drip in 337 (93.6%) patients.

On 11th day all patients were reevaluated. A total of 317 (88.1%) patients had complete resolution of symptoms and signs while in 43 (11.9%) patients either all or some symptoms or signs persisted. (Fig. 1) In Group A 161 (89.44%) patients had complete resolution of signs and symptoms while 19 (10.56%) patients failed to achieve complete resolution. In Group B, 156 (86.66%) had complete resolution of signs and symptoms while 24 (13.33%) failed to do so. No statistically significant difference was seen between two groups in the frequency of patients who had complete resolution of signs and symptoms; $p = 0.416$ (Table 1). The mean duration of resolution of signs and symptoms in Group A was 5.7 ± 1.604 days as compared to 5.96 ± 1.47 days in Group B with P value, $p = 0.134$. (Table 1). Hence the two drugs were similar in efficacy.

DISCUSSION

Numerous studies have compared the efficacy of the amoxicillin, the cephalosporins and macrolides but no significant difference was noted between any of the treatment regimens for the initial empiric management of acute sinusitis. The fluoroquinolones with enhanced activity against *S. pneumoniae* have been introduced into clinical practice and have an indication for the treatment of acute bacterial sinusitis. Currently, there are three fluoroquinolones with an indication to treat acute bacterial sinusitis: moxifloxacin, gatifloxacin, and levofloxacin. Three trials compared 10 to 14 days of levofloxacin 500 mg OD with either clarithromycin 500 mg twice daily^{11,12} or amoxicillin-clavulanate 500/125 mg three times daily in sinusitis.¹³ When assessed 2 to 5 days after completion of therapy, 88 to 95% of patients treated with levofloxacin achieved clinical cure or were significantly improved, demonstrating equivalency to its comparators, clarithromycin or amoxicillin-clavulanate.

Wald et al¹⁴ compared a 10-day course of amoxicillin and amoxicillin-clavulanate with placebo in 93 children. The overall 10-day cure rate in children receiving antibiotics was 67%, compared with only 43% of those receiving placebo. A recently completed placebo-controlled trial in the pediatric population also failed to show a difference between placebo and amox-

icillin or amoxicillin-clavulanic acid treatment of acute sinusitis.¹⁵ In another randomized trial 83% of patients receiving amoxicillin had improvement of signs and symptoms in sinusitis compared with 77% of patients on placebo.¹⁶ The vast majority of trials are designed to prove equivalency and are not powered to demonstrate the superiority of one agent over another. In a study at Department of Otolaryngology, University of Pittsburgh, pharmacokinetically enhanced amoxicillin/clavulanate 2000/125 mg was developed to be effective against the common Acute sinusitis pathogens, including many resistant strains.¹⁷

Wald et al¹⁸ in 2009 study also determined the effectiveness of high-dose amoxicillin/potassium clavulanate in the treatment of children diagnosed with Acute bacterial Sinusitis. Children receiving the antibiotic were more likely to be cured (50% vs 14%) and less likely to have treatment failure (14% vs 68%) than children receiving the placebo. Recently some studies have shown that levofloxacin 500 mg once daily is an effective and safe treatment for acute bacterial sinusitis. In a study Sydnor et al¹⁹ evaluated the efficacy and safety of levofloxacin (500 mg orally once daily for 10 to 14 days) in treating 265 adult outpatients with acute bacterial sinusitis and observed that 243 (92%) remained well 4 to 6 weeks after therapy; and 21 (8%) had a relapse of symptoms.

Gehanno et al²⁰ evaluated the efficacy and tolerance of oral levofloxacin (500 mg once a day during ten days), as a treatment for acute bacterial sinusitis in 231 patients. Clinical success was observed in 94.1% patients (95/101), and 85.1% (86/101), respectively 7 to 14 days and three to four weeks after the end of treatment. Few studies have compared amoxicillin-clavulanate and levofloxacin in ABRS. In one such study by Adelglass et al¹³ compared amoxicillin-clavulanate and levofloxacin in ABRS. The success rates (cured and improved) 2 to 5 days after the end of treatment were 88.4% for the 267 clinically evaluable patients who received levofloxacin and 87.3% for the 268 clinically evaluable patients who received amoxicillin-clavulanate. The results of this study show that once-daily administration of levofloxacin is as effective and better tolerated than amoxicillin-clavulanate administered 3 times daily in treating acute sinusitis in adult patients as seen in our study. In another similar trial, Jareoncharsri et al²¹ compared the clinical efficacy and bacteriological response of levofloxacin and amoxicillin/clavulanic acid (co-amoxiclav) in sixty patients having purulent maxillary sinusitis for 14 days. This study demonstrated that levofloxacin 300 mg orally once daily was as effective and safe as amoxicillin/clavulanic acid 625 mg three times a day in the treatment of maxillary sinusitis, either acute or

acute exacerbation. Both drugs showed bacteriological efficacy that was not significantly different. Our study demonstrated that administration of levofloxacin 500 mg once daily was as effective as co-amoxiclav two times daily in the 10-day treatment of adult purulent sinusitis. The clinical success rate (cure or improvement) was slightly higher in the co-amoxiclav group (89.44%) than in the Levofloxacin group (86.66%). The clinical success rate of levofloxacin in this study was comparable to other levofloxacin studies done by Adelglass et al, 13 (88.4%), Sydnor et al¹⁹ (88.0%) and Lasko et al 22 93.9%. These success rates were also correlated with the efficacy results from sinusitis studies with other oral antimicrobial agents done by Sam and Cambell²³ which ranged from 74% to 95%.

CONCLUSION

There was no significant difference in the frequency of patients who had complete resolution of signs and symptoms between the Amoxicillin-Clavulanate and Levofloxacin receiving patients; hence the two drugs were similar in efficacy. The once daily dosage regimen of Levofloxacin seems to be convenient for patients and is likely to produce better compliance.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Muhammad R: Creation of idea.

Zaman A: Data collection.

Raza A: Statistics.

Khan Z: Followup and editing.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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