



ANTIBIOTIC THERAPY IN PNEUMONIA: A COMPARATIVE STUDY OF ORAL ANTIBIOTICS IN A RURAL HEALTHCARE CENTRE

ADITYA UDUPA¹, *PANKAJ GUPTA²

Department of Pharmacology, B. J. Medical College and Sassoon General Hospital, Pune, India 400607, Department of Preventive and Social Medicine, Seth G. S. Medical College and KEM Hospital, Mumbai, Email: draaditya.udupa@gmail.com, pankajgupta85@rediffmail.com

Received: 29 Feb 2011, Revised and Accepted: 30 March 2011

ABSTRACT

Pneumonia is an infection of the pulmonary parenchyma. The current recommendations for treating pneumonia on an outpatient basis are to use a respiratory fluoroquinolone or a macrolide or a β -lactam. The study was conducted in the Rural Health Training Centre in Thane District to assess the efficacy of the recommended drugs for pneumonia in comparison to each other. All patients with a presumptive diagnosis of pneumonia were asked to undergo a chest X-ray, sputum microscopy and leukocyte count, to make a definitive diagnosis of pneumonia. The patients who fit into the inclusion criteria were randomized and either given a **macrolide** [clarithromycin (500 mg PO bid) or azithromycin (500 mg PO once, then 250 mg od)] OR a **respiratory fluoroquinolone** [levofloxacin (750 mg PO od)] OR a **β -lactam** [high-dose amoxicillin (1 g tid)]. A total of 31 patients were studied. No significant difference was detected regarding clinical success or mortality, regardless of atypical coverage or between antibacterial classes with similar atypical coverage. It was not possible to demonstrate any advantage of specific anti-bacterial for mild community-acquired pneumonia in relatively healthy outpatients. In mild-to-moderate cases of outpatient-treated community-acquired pneumonia, it might be most appropriate to select antibacterial according to side-effects, patient preferences, availability and cost.

Keywords: Pneumonia, Antibacterial, Treatment, Outpatients.

INTRODUCTION

Pneumonia is an infection of the pulmonary parenchyma. Despite being the cause of significant morbidity and mortality, pneumonia is often misdiagnosed, mistreated, and underestimated. Pneumonia results from the proliferation of microbial pathogens at the alveolar level and the host's response to those pathogens. Microorganisms gain access to the lower respiratory tract in several ways. The most common is by aspiration from the oropharynx. Small-volume aspiration occurs frequently during sleep (especially in the elderly) and in patients with decreased levels of consciousness. Many pathogens are inhaled as contaminated droplets¹.

The current recommendations for treating pneumonia on an outpatient basis are to use a respiratory fluoroquinolone or a macrolide or a β -lactam^{1,2}. We decided to study the outcome on a clinical and radiological basis of these different antibiotics in patients of pneumonia who were treated on an outpatient basis.

MATERIALS AND METHODS

The study was conducted in the Rural Health Training Centre, Ramakrishna Mission, Sakwar Village, Thane District, India. 18 to 55 years with complaints of fever (oral temperature > 98.5°F), with cough and/ or breathlessness for more than 2 days were selected. After a detailed clinical history the attending doctor was asked to make a clinical diagnosis of pneumonia based on symptoms and signs of bronchial breathing with dull notes on percussion. After a presumptive diagnosis was made each of these patients was explained the nature of the study and asked to fill an informed consent form. Sputum was collected for gram stain. Blood was withdrawn for Haemoglobin and total blood counts. The patients were also asked to undergo a chest X-Ray PA view. The reports of these tests were usually available within 4 hours.

A definitive diagnosis of pneumonia was based on a clinical diagnosis along with either a radiological patch on chest X-Ray or presence of gram positive or negative bacteria on sputum microscopy. An elevated neutrophil count was necessary in either of the case.

Patients who had cough of more than 1 week were asked to report to the nearby RNTCP centre. Any patients who had symptoms of

confusion, severe breathlessness, pleural effusion, or required hospitalization for either a co-morbidity or due to his respiratory condition was immediately referred to the nearby tertiary level hospital.

The patients who fit into the inclusion criteria were randomized and were given, either a macrolide [Clarithromycin (500 mg PO BD) or Azithromycin (500 mg PO once, then 250 mg OD)] or a respiratory fluoroquinolone [levofloxacin (750 mg PO OD)] or a β -lactam [high-dose amoxicillin (1 g TID)]. The patients were asked to take the first dose in the OPD itself and were asked to report on the third and the fifth day. A clinical check up was done during the subsequent visits.

Any patient who during the course of his prescribed treatment worsened in condition was referred to the nearby tertiary level hospital. Compliance was checked by the return tablet count.

RESULTS

During the course of three months from June 09 to Sep 09 a total of 180 patients came with complaints of fever with cough. On further check-up 43 were diagnosed as having clinical signs of pneumonia. Out of these 2 were immediately referred to the tertiary centre for further treatment. Out of the remaining 41, six patients did not show either consolidation or organisms on sputum smear hence were not included in the study. Thirty five patients received antibiotic therapy for their condition and out of these 35 patients, one patient was referred to the tertiary care centre due to increasing breathlessness the very same day of starting antibiotic therapy. Two patients did not come for the second visit and one more did not come for the final visit at day 5. The final data was analysed for thirty one patients.

The incidence of gastritis and diarrhoea was higher in the amoxicillin group. Levofloxacin caused headache in maximum patients. Two patients developed a rash (one on the second day and the other on the third) due to the antibiotic. However since the rash was mild the patients were kept in observation in the centre and given anti-histamines. Most of the adverse events observed during the study resolved spontaneously. For the rest symptomatic treatment was given. None of the patients required either admission or referral due to adverse events.

Table 1: Characteristics of the enrolled patients

Parameter	No of patients (percent value)
Total patients	31
Male	21 (67.74)
Female	10 (32.26)
Age	
18 – 21	6 (19.35)
21 – 31	7 (22.58)
31 – 41	11 (35.48)
41 – 55	7 (22.58)
Previous Diabetes	2 (6.45)
Previous hypertension	3 (9.67)
With patch on chest X-ray	22
With sputum showing organism on gram stain	20
Gram positive organism	14
Gram negative organism	6

Table 2: Characteristics of patients allotted to different treatment groups

Antibiotic	No of patients	Average age	Average WBC count	No organism on gram stain	Gram positive organism	Gram Negative organism
Clarithromycin	8	32.20	11000	3	3	2
Azithromycin	7	29.42	10800	2	4	1
Levofloxacin	7	33.67	10120	2	2	3
High-dose amoxicillin	9	38.87	11980	4	5	0

Table 3: Monitoring response of different treatments on the first (day 3) and second (day 5) visit

Antibiotic	WBC count			Temperature		
	Day 0	Day 3	Day 5	Day 0	Day 3	Day 5
Clarithromycin	11000	7000	5500	101.4	98.7	97.8
Azithromycin	10800	4300	4000	101.3	98.8	97.5
Levofloxacin	10120	4230	3850	99.8	99.2	98.4
High-dose amoxicillin	11980	6500	4950	101.1	99.9	98.6

Table 4: Monitoring response of different treatments on the first (day 3) and second (day 5) visit

Antibiotic	Cough (No of patients)			Respiratory rate (Average)			Bronchial breathing (No of patients)		
	Day 0	Day 3	Day 5	Day 0	Day 3	Day 5	Day 0	Day 3	Day 5
Clarithromycin	8	6	2	21	17	15	8	4	1
Azithromycin	7	4	2	23	18	14	7	4	2
Levofloxacin	7	5	4	21	18	16	7	4	2
High-dose amoxicillin	9	7	3	24	19	17	9	6	3

Table 5: Adverse events noted

Drug	Adverse events			
	Diarrhoea/ Abdominal pain	Rash/ Skin eruptions	Headache	CVS
Clarithromycin	2	0	2	0
Azithromycin	3	1	1	0
Levofloxacin	2	0	3	0
High-dose amoxicillin	6	1	0	0

DISCUSSION

Pneumonia is a frequent clinical problem in India with an incidence of 16%³. The standard therapy of pneumonia is empirical treatment of the patient since a definitive diagnosis may not be possible in all cases and is also time consuming whenever available^{1,2}.

However the present guidelines in standard textbooks give a wide array of treatment guidelines both for treatment on an O.P.D basis and for treatment in the ward. In the present study we tried to measure the outcomes of the various therapies that were available with us in the Rural Health Training Centre, Ramkrishna Mission, Sakwar Village, Thane District. We found that the various forms of antibiotic therapies were almost similar in terms of efficacy. However Levofloxacin and Azithromycin had better effect in

reducing fever and W.B.C counts. Patients were symptomatically relieved earlier with the use of Azithromycin. In our setup all medications are provided free of cost, however during private practice where the patients have to purchase the drugs themselves amoxicillin is cheap as compared to levofloxacin and azithromycin.

In summary no significant difference was detected regarding clinical success or mortality, regardless of atypical coverage or between antibacterial classes with similar atypical coverage. It was not possible to demonstrate any advantage of specific antibacterial for mild community-acquired pneumonia in relatively healthy outpatients. The need for coverage of atypical pathogens in this setting was not apparent. In mild-to-moderate cases of outpatient-treated community-acquired pneumonia, it might be most

appropriate to select antibacterial according to side-effects, patient preferences, availability and cost.

REFERENCES

1. Fauci AS, Braunwald E, Kasper DL. Harrison's Principles of Internal Medicine. 17th ed. McGraw-Hill Professional Publishing; 2008.
2. Lutfiyya MN, Henley E, Chang LF, Reyburn SW. Diagnosis and Treatment of Community-Acquired Pneumonia. American Family physician. 2006 Feb 1;73(3):442-450
3. Agnihotram V. Ramanakumar, Chattopadyay Aparajita: Respiratory Disease Burden In Rural India: A Review From Multiple Data Sources. The Internet Journal of Epidemiology. 2005; 2: 2.