STUDY OF COMMUNITY-ACQUIRED LOWER RESPIRATORY TRACT INFECTIONS IN A TERTIARY CARE CENTRE

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ABSTRACT

BACKGROUND

Community-acquired lower respiratory tract infections are common in clinical practice. Only a fraction of them report to hospitals. They are associated with considerable morbidity and mortality.

MATERIALS AND METHODS

Patients of cough with expectoration of more than 10 days with history of fever having negative test for AFB and no symptoms and signs suggestive of asthma or COPD were included the study. Patients with pulmonary shadows in the X-ray, past or present tuberculosis were excluded.

RESULTS

Among these patients, males constituted 60% and females 40%. Diabetes mellitus was seen in 10.38% and hypertension in 11.68%. Maximum number of patients were seen in 30-39 years age group. Out of the 77 patients studied, 39 patients responded to routine antibiotic therapy. 5 patients required culture and sensitivity. Causative organism was Streptococcus pneumonia in three and Staphylococcus aureus in two. They responded to organism based on culture and sensitivity pattern. 33 patients did not respond to routine antibiotic therapy and they had peripheral eosinophilia of >400 AEC and sputum eosinophilia. 27 patients had AEC of 400 to 650. 6 patients showed AEC of >650 and 2 patients had over 1000, and one patient had AEC of 2300. 4 of them gave history of exposure to cotton dust in cotton industries. Bronchoscopy was performed and washings were sent for analysis in those patients. Among 33 patients, 22 responded to DEC 6-8 mg/kg in divided doses for 3-4 weeks. 6 of these patients were given ivermectin and albendazole for 2 weeks. 11 patients responded to bronchodilator therapy.

CONCLUSION

Community-acquired lower respiratory tract infections are an important cause of morbidity and mortality. In our study, majority of patients responded to antibiotic therapy but good number of patients had tropical eosinophilia responding to antifilarial therapy. Though there is no apparent bronchospasm on clinical examination, 11 of 33 had low FEV1 and they responded to bronchodilator therapy. Tropical eosinophilia and bronchospasm occurred in 42% patients.

KEYWORDS

Community Acquired, Tuberculosis, Eosinophilia, Drug Resistance.

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BACKGROUND

Community-acquired lower respiratory tract infections are common. Most of the patients do not come to hospitals. They are associated with considerable morbidity and mortality especially for those having comorbidities. Common organisms associated include Streptococcus pneumonia, Staphylococcus aureus, Haemophilus influenza, and Moraxella catarrhalis. Community-acquired lower respiratory tract infections can be due to bacterial, viral or atypical pathogens. Majority of the patients respond to routine antibiotic therapy. But a good number of patients require alternative medication.

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MATERIALS AND METHODS

We have chosen 210 patients with history of cough with expectoration with or without fever of >10 days in our prospective study.

Inclusion Criteria

All the patients with cough with expectoration of >10 days with or without fever presenting to our tertiary care centre.

Exclusion Criteria

1. Patients positive for AFB.
2. Patients having history suggestive of bronchial asthma or COPD.
3. Patients having active wheeze in clinical examination.
4. Patients with history of tuberculosis.
5. Those patients with pulmonary shadows in the X-ray.
6. We excluded patients with upper respiratory tract infections and patients having common cold, postnasal drip, palatine tonsillitis or pharyngitis.

Patients were given initial antibiotic therapy in the form of Azithromycin, Clarithromycin, Doxycycline and Cefpodoxime proxetil. Those patients who did not respond to primary therapy presenting with yellowish sputum and fever were subjected to sputum culture. We collected early morning sputum. And we instructed the patient to avoid saliva and to get sputum from lower respiratory tract.

The culture media included blood agar and chocolate agar for Gram-positive organisms and MacConkey agar for Gram-negative organisms. Antibiotics were given basing on culture report. Drugs administered for these patients included Clavulanate Amoxicillin, Ceftriaxone injections and Linezolid.

RESULTS

Among a total of 210 patients with the selected criteria, 77 patients were chosen. 133 patients had pulmonary shadows in the X-ray and were excluded from the study. Comorbidities were observed in 17 patients (22.07%). Diabetes Mellitus was seen in 8 patients (1038%) and Hypertension was observed in 9 patients (11.68%).

Majority of the patients belonged to 30-39 years age group. Among the 77 patients, 39 patients responded to routine antibiotic therapy of Macrolides, Doxycycline or Cefpodoxime proxetil. Culture and sensitivity was done for patients who continued to have yellow sputum and fever. 5 patients showed positive culture. Among these five patients, 3 patients had Streptococcus pneumonia and 2 patients had Staphylococcus aureus grown in their sputum. Two patients had sterile culture. These five patients responded to antibiotic basing on the culture (Injectable Ceftriaxone, Clavulanate Amoxicillin).

Among the 33 patients who did not respond to antibiotic therapy, a detailed peripheral smear was done. All these patients had high Absolute eosinophilic count (AEC). 27 out of 33 patients had an AEC of 400-650. Only 6 patients had AEC of more than 650. One patient had AEC of 2300. Serum IgE levels were done among these 33 patients. 24% had < 400 IU/mL, 48% had between 400 to 1000 IU/mL and 27% had their IgE levels >1000 IU.

Among these patients, 22 patients responded to DEC or Ivermectin + Albendazole therapy. Among our patients who responded to Antifilarial drugs, they required DEC therapy for more than one month. 7 of the 22 required short corticosteroid therapy for one week.

11 of these patients did not respond to antifilarial treatment. These patients were subjected to thorough spirometry testing. Their FEV1 ranged from 60 to 85% of predicted value. They responded to bronchodilator therapy.

Sl. No.	Without Radiological Shadows	With Radiological Shadows	Total
1.	77 (36.66%)	133 (73.34%)	210
Table 1. Total Number of Patients			

Sl. No.	Investigation	No. of Patients
1.	CXR	Negative =77
2.	AEC >400	33
Table 2. Patients without Radiological Shadows: Total 77		

Sl. No.	Males	Females	Total
1.	46 (59.74%)	31 (40.26%)	77
Table 3. Sex Distribution of X-Ray Negatives			

Age Group	Males	Females	Total
20-29	09	06	15
30-39	22	17	39
40-49	06	04	10
50-59	08	02	10
>60	01	02	03
	46	31	77
Table 4. Age Distribution			

Comorbidities	No. of Patients	Percentage
Diabetes Mellitus	8/77	10.38
Hypertension	9/77	11.68
Table 5		

Type of Treatment	Response	No Response	Total
Antibiotic therapy 1st line	39	5	44
Antibiotic Following culture	5	0	05
Table 6			

Response to Antibiotic therapy:

Total No. of patients Responded to antibiotic therapy: 44

Eosinophilic Count	No. of Patients	Percentage
400-650	27	81%
>650	6	19%
Table 7		

No. of Patients having Peripheral Eosinophilia of >400: 33

Serum IgE Levels	No. of Patients	Percentage
< 400 IU/mL	8	24.24%
400-1000 IU/mL	16	48.48%
>1000 IU/mL	9	27.27%
Table 8		

Serum IgE Levels: Total number of Patients: 33

Type of Treatment	Responders	Non-Responders	Total
DEC/Ivermectin plus Albendazole	22	11	33
Bronchodilator Medication	11	00	11
Table 9			

Treatment or Eosinophilic Group:

DISCUSSION

Community-acquired lower respiratory tract Infections are very common. We have included patients who have cough with expectoration, fever of more than ten days' duration and whose sputum was negative for AFB. We excluded patients of old or active tuberculosis, known asthmatics, COPD and those presenting with active bronchial asthma. All these patients had abnormal X-ray chest.

Among our patients, 44 patients responded to antibiotic therapy. 39 patients responded to Azithromycin or beta lactam antibiotics. 5 patients required culture as they did not respond to first line oral antibiotic therapy. They responded to injectable broad-spectrum beta lactam drugs. Drug resistance is common in our setting.

Comparative Studies

Robert Guthrie et al suggested fluoroquinolones as the resistance increases in Community-acquired LRTIs.[1] But in India fluoroquinolones are considered for drug-resistant tuberculosis and their usage should be restricted.

Seiamawit Muihoiuian et al suggested restricted use of antibiotics particularly in children with Mycoplasma pneumonia.[2] Use of macrolides is justified and Mycoplasma responds to macrolide therapy. In our study, we did not look for atypical pathogens.

Community-acquired LRTI are increasing with increased aged population and it is associated with considerable morbidity and mortality.[3] India also faces similar problems in the elderly and LRTIs are very important and increase the health burden among families.

Christian Marchello et al found atypical organisms like M. pneumoniae and Chlamydia in 13.6% of community-acquired LRTIs and bronchitis.[4] In our study, we did not look for atypical organisms.

Margaret S. Houston stressed the need for investigating unhospitalised lower respiratory tract infections in the elderly.[5] Elizabeth R. C. Millett also stressed the importance of Community-acquired LRTI and CAP and noted their incidence increases with age. Michael A. Saubolle et al stated that annual incidence of CAP amounts to 5 million with one-tenth of them requiring hospital admission.[6] Probably community-acquired LRTI are a several fold higher and responsible for considerable morbidity particularly in high risk patients.

M. Woodhea et al did not find any causative organism in many of their studies of CAP and LRTI. There can be polymicrobial infections, viral infections and mixed bacterial and viral infections among cases of LRTI and CAP. In our study, we only gave empirical antibiotic therapy which could cover routine bacteria and atypical organisms.

Gary Patov et al found Streptococcus pneumonia, H. influenzae and Moraxella catarrhalis are the common organisms found with growing resistance. He suggested the administration of Gemifloxacin which is useful against Gram-positive, Gram-negative and atypical organisms. But in the Indian context use of fluoroquinolones should be restricted.[7]

In A.O. Okesola study, organism could be found in 27% cases of Community-acquired LRTI. Single pathogen was identified in 95% and multiple pathogens in 5%. Commonest organism isolated was Klebsiella susceptible to Ciprofloxacin, gentamicin and ceftriaxone.[8] Beta lactamases were produced by 6.1% H. influenzae strains and all the strains of Moraxella catarrhalis.

In a Turkish study of LRTI H. Influenzae, Streptococcus pneumonia and Moraxella catarrhalis were the organisms isolated. 6.1% cases of H. influenzae and all the strains of M. catarrhalis produced beta lactamases. 32% of Streptococcus pneumoniae were moderately resistant to penicillin.[9]

J. Barberán study showed similar organisms in LRTI and they advised third generation cephalosporin cefditoren for the treatment of resistant LRTIs[10]

In a Nigerian study of Adekunle O.Tet. Al. Streptococcus pneumoniae and gram-negative organisms like Klebsiella and Pseudomonas were found and they suggested Fluoroquinolones could be most effective.[11]

Among our cases initially diagnosed as lower respiratory tract infections, 22 out of 77 cases showed signs of Tropical pulmonary eosinophilia. Filarial infections like Wuchereria bancrofti, Brugia malayi and Loa ioa are common organisms in the coastal regions in India. Cases of filarial elephantiasis have come down but tropical pulmonary eosinophilia with breathlessness, cough with expectoration with mucoid sputum with or without fever are common presentation in clinical practice. 17 out of 22 patients showed positive for filarial antibody test.

25 out of 33 patients had elevated serum IgE. 9 out of 33 showed levels above 1000 IU/mL. Response to DEC was good in a dose of 6-8 mg/Kg body weight. 5 out of 22 responded to 3 weeks' therapy. 11 out of 22 required 1 month of more of antifilarial therapy with short corticosteroid therapy of one week. Six people required treatment with Ivermectin and albendazole for 2 weeks for control of symptoms.

Jai B. Mullerpattan and Udwadia explained the pathology may vary from an acute eosinophilic alveolitis to histiocytic infiltration and if not treated the condition of TPE can cause considerable respiratory morbidity[12,13]

TPE is considered as a differential diagnosis among patients with eosinophilia particularly those migrating to Canada from south Asian countries.[14.]

An Australian study also stressed the importance of TPE when the history is supportive of exposure to lymphatic filariasis, elevated serum IgE levels (> 1000 IU/mL), increased titres of antifilarial antibodies, peripheral blood negative for microfilariae; and clinical response to diethylcarbamazine.[15] Paula Pinkston, V. K. Vijayan described increased number of eosinophils in the BAL fluid and decrease of eosinophils following treatment with DEC.

There is a third group of patients in our study who did not respond to antibiotic therapy or antifilarial therapy but responded to bronchodilator therapy. Pulmonary function tests were performed among these 11 patients. All of them showed decreased FEV1 ranging from 60 to 85%.

Summary

Community-acquired lower respiratory tract infections are important cause of morbidity. Majority of these patients are not admitted in the hospitals. Majority of patients responded to empirical antibiotic therapy, but a few of them required culture and sensitivity. Tropical pulmonary eosinophilia should be considered as a differential diagnosis when the patients do not respond to antibiotic therapy. They constituted 22 out of 77 patients. They responded to DEC, Ivermectin + Albendazole with or without corticosteroid therapy. Most of these patients in our study required more than one month of therapy with DEC. Bronchodilators should be considered among patients who do not respond to antibiotics alone or with DEC. Pulmonary function should be done for such patients who may show persistent bronchospasm despite normal clinical examination and because of bronchospasm they do not respond to antibiotic therapy.

CONCLUSION

Community-acquired LRTIs commonly present with cough with expectoration of more than 10 days without any evidence of bronchospasm. Most of the productive coughs occur from upper respiratory tract infections, common cold, postnasal drip, acute pharyngitis and tonsillitis. They were excluded from the study. Lower respiratory tract infections may be caused by bacterial pathogens, typical or atypical organisms and viral infections. Most of them respond to antibiotic

therapy. TPE is also common in our areas and has to be ruled out. It is common practice to encounter cases of prolonged cough which do not respond to routine antibiotic therapy. Majority of the patients of tropical eosinophilia have eosinophil count of 400 to 650 AEC. Among the non-responders, a good number of patients present with bronchospasm but without any evidence of clinical wheeze. Bronchospasm can occur in lower respiratory infections silently and pulmonary function tests should be considered in appropriate cases.

Abbreviations

LRTI: Lower respiratory tract Infections, AFB: Acid-fast Bacilli, COPD: Chronic Obstructive Pulmonary Disease, AEC: Absolute Eosinophilic Count, TPE: Tropical Pulmonary eosinophilia, DEC: Diethylcarbamazine Citrate.

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