INTRODUCTION

Pneumonia is one of the most common and important cause of human disease in terms of morbidity, mortality and economic cost to the society. The incidence of pneumonia on an average in community is around 10-12 cases per 1000 persons in a year. The incidence of pneumonia varies from 2-15 cases per 1000 persons depending upon age, sex, race and socioeconomic condition. The important mechanism of entry of organisms into the lungs is aspiration of previously colonized bacterial flora of nose and oropharynx through tracheobronchial tree. Development of pneumonia depends upon the bacterial load, virulence of the bacteria and immunological status of the host. 1,2,3

As there is no gold standard method of diagnosis for pneumonia; patients having symptoms of cough, fever, pleuritic chest pain, sputum along with clinical, radiological signs of consolidation supported by laboratory value of leukocytosis with neutrophilia are diagnosed as a case of pneumonia in everyday practice as etiological (microbiological) diagnosis is frequently not made and antibiotic therapy has to be empirical. Several studies favour microbiological cause of community acquired pneumonia in immunocompetent patients in which streptococcus pneumoniae accounts for 40% of cases. 1,2 Anaerobic bacteria accounts for 20-35% cases, mixed infection around 10% and atypical organisms around 5%. 3 The common empiric antibiotic regimen prescribed to treat community acquired pneumonia is

- A Beta lactam antibiotic plus macrolide
- Amoxicillin clavunate plus macrolide
- Cefixime plus macrolide
- A fluoroquinolone alone

Although, anaerobic bacteria constitutes a major role in community acquired pneumonia.
proportion of community acquired pneumonia, routine administration of metronidazole as a component of empiric treatment is not emphasized in most of the studies and not included in the treatment guidelines.

MATERIALS AND METHODS

In this randomized clinical trial (evidence based) study, 106 patients diagnosed with community acquired pneumonia were selected among the patients attending the outpatient department of pulmonary medicine, Mamata Medical College, Khammam, Telangana state. Within a period of 10 months, (1st June 2014 to 28th Feb 2015) patients having symptoms of cough with sputum of less than one week duration with variable rise of temperature were selected randomly. Patients were subjected for clinical, radiological and laboratory evaluation for community acquired pneumonia. After being diagnosed as community acquired pneumonia, the selected patients were subjected for empiric antibiotic therapy with triple drug combinations of cefixime, azithromycin and metronidazole for 7 days. Cefixime was given in a dose of 250mg BID, azithromycin in a dose of 250mg BID and metronidazole in a dose of 400mg TID; irrespective of the age and sex as considered in the study criteria as follows.

Inclusion Criteria

- Age group: 15 to 55 years.
- Sex: Both males and females.
- Chief complaints: Cough, sputum, fever, pleuritic chest pain, shortness of breath (along with cough if any one of these symptoms present)
- Duration of symptoms: Less than one week.

Exclusion Criteria

- Presence of co-morbidities like diabetes mellitus, cardiac diseases, systemic diseases, immunocompromised states/disease, chronic obstructive pulmonary disease, bronchial asthma, pleural effusion.
- With history of past pulmonary tuberculosis and other pulmonary diseases.
- History of hospitalization and antibiotic therapy in the past 12 weeks.

The selected group of patients were initially evaluated clinically, radiologically and on a simple laboratory test of total leukocyte count and differential white cell count. On the basis of supportive criteria of any two out of these three primary evaluatory methods, the patient was diagnosed as a case of community acquired pneumonia and subjected for empiric antibiotic therapy as mentioned earlier. After starting therapy all patients were evaluated at the end of 3rd day. Patients showing complete resolution of symptoms were finally followed up at the end of 7th day.

Patients not showing complete resolution at the end of 3rd day were again followed up at the end of 5th and 7th day. Radiological evaluation was done for all the patients at the end of 7th day. Post evaluation data was collected, arranged and analyzed in the context of medical statistics.

RESULTS

Effect of empiric antibiotic therapy with cefixime + Azithromycin + Metronidazole in those patients were noted as follows:

Fever subsided in 76 patients at the end of 3rd day, in another 4 patients at the end of 5th day and in another 6 patients at the end of 7th day. Total in 86 patients fever subsided on 7th day out of 106 patients. However fever persisted in 20 patients after 7th day.

Cough subsided in frequency as well as in sputum production in 66 patients at the end of 3rd day. In another 18 patients at end of 5th day, and in another 2 patients at the end of 7th day. Total in 86 patients cough settled on 7th day. However cough persisted in 20 patients after 7th day.

Leukocytosis comes to normal in 70 patients at the end of 3rd day. In another 12 patients at end of 5th day and in another 4 patients at end of 7th day. Total in 86 patients cough settled on 7th day. However cough persisted in 20 patients after 7th day.

Out of 74 patients showing radiological opacities, 50 patients showed resolution at the end of 7th day. In 18 patients radiological improvement was not appreciated and in 6 patients radiological opacities were worsened. Overall 86 patients
were improved fully at the end of 7th day. 14 patients were advised for hospitalization at the end of 3rd day, 4 patients at the end of 5th day and 2 patients at the end of 7th day due to persistent fever and cough. So total 20 patients needed hospitalization.

As per trimode evaluation methods of these patients it has been observed that

**Symptom wise:**
- Fever, cough with sputum were present in all 106 patients
- Mild shortness of breath was present in 26 patients
- Pleuritic chest pain was present in patients

**Clinical Examination/Lab study/Radiology wise:**
- Clinical signs of consolidation was present in all these patients.
- Leukocytosis (mild to moderate) was present in all these patients.
- Radiological signs of consolidation was present in 74 patients. (Table 1)

<table>
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<th>S.NO</th>
<th>Evaluation Parameters</th>
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<th>5th day end Improved</th>
<th>7th day end Improved</th>
<th>Not Improved</th>
<th>Total</th>
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<td>(4)</td>
<td>(6)</td>
<td>20</td>
<td>106</td>
</tr>
<tr>
<td>2</td>
<td>Cough</td>
<td>66</td>
<td>(8)</td>
<td>(2)</td>
<td>20</td>
<td>106</td>
</tr>
<tr>
<td>3</td>
<td>Leukocytosis</td>
<td>70</td>
<td>(12)</td>
<td>(4)</td>
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<td>106</td>
</tr>
<tr>
<td>4</td>
<td>Radiological shadow</td>
<td>Not repeated</td>
<td>Not repeated</td>
<td>Repeated 50 (Out of 74 Patients)</td>
<td>24</td>
<td>74</td>
</tr>
</tbody>
</table>

**Table-1:** Shows the outcome of community acquired pneumonia in the study group evaluated through clinical examination, lab findings and radiological features.

**DISCUSSION**

The use of metronidazole in combination with penicillin in treating aspiration pneumonia is based on several studies from 1970s that reported predominantly anaerobic flora from percutaneous, transtracheal and thoracocentesis samples. However no trials have compared empiric antimicrobial regimens for aspiration pneumonia with and without metronidazole. No definite data is available to describe the value of add on therapy of metronidazole for aspiration pneumonia. Still consensus exists that it should not be used as monotherapy in the treatment of community acquired pneumonia. 

Despite references to metronidazole in review of aspiration pneumonia treatment, adequate clinical data is lacking to describe its safety and efficacy when added to empiric regimen for community acquired pneumonia.

Fever and cough were the main symptoms found invariably in all the patients, shortness of breath (24%), and pleuritic chest pain (0.5%) are the least symptoms. Radiological abnormality was present in (70%) cases and leukocytosis with neutrophilia were present in (100%) cases. On addition of metronidazole with empiric therapy, post 3rd day relief was found in majority of cases like in fever (71%) cough (62%), leukocytosis (66%). Radiological improvement was assessed at the end of 7th day and improvement noticed in 67%. Improvement in the evaluation parameters after 5th & 7th day constitutes another 5% to 12%. 20 patients (18%) did not improve during the course of therapy and were advised hospitalization for further evaluation and treatment.

Aspiration is the commonest mechanism for the disease process of CAP. Anaerobes are isolated in a major portion of CAP in various studies. Most of the patients (80%) need ambulatory treatment with empiric regimens. Though a definite indication of metronidazole is well established in treating anaerobic infection in several studies, but this drug is still not included in empiric treatment of CAP in most of the guidelines. Several studies showed clinical improvements in 53% to 67% patients after 7th to 14th days of post empiric treatment, containing regimens without metronid-
Benefit of metronidazole includes its low cost, availability as intravenous and oral formulations, generally mild adverse effect profile and extremely low levels of resistance while no trials have specifically evaluated metronidazole in combination with other antibiotics for treatment of CAP. However Sanford guide to antimicrobial therapy, recommends metronidazole in combination with either amoxicillin-clavulanate or ceftriaxone as an alternative regimen for treating CAP.

CONCLUSION

Our study showed favorable criteria to add metronidazole in empiric antibiotic treatment for CAP, as evidenced by a significant decrease in overall symptoms, control and resolution of CAP. So, it should be included in various guidelines for treating community acquired pneumonia.

REFERENCES