



Clinical and Bacteriological Profile of Patients Admitted to ICU with Community Acquired Pneumonia in a Tertiary Care Centre

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Abstract

Introduction: Community acquired pneumonia (CAP) causes significant mortality and morbidity all over the world, especially in developing countries like India. There is scarce data on the bacteriological profile in patients admitted to ICU from South India so it is necessary to study the clinical and bacteriological profile of these patients for better understanding and treatment of pneumonia.

Methodology: We conducted a prospective study in department of Pulmonology in a tertiary care centre during October to December 2017. Consecutive patients admitted with community acquired pneumonia (CAP) were included in the study after obtaining informed consent. Patients with Hospital acquired pneumonia, Health care associated pneumonia were excluded from the study. All patients were interviewed with questionnaire, which included demographic data, risk factors like smoking and alcoholism, comorbidities, number of admissions, emergency visits, use of intravenous or oral antibiotics in past, respiratory past medical history such as COPD, bronchiectasis and asthma.

Results: 70 patients were included into study. Mean age of the cohort was 42.5±10.2 years and 45 (64.28%) of them were men. More than half the populations (52%) were chronic smokers. COPD (20%) was the most common comorbidity. Of 70 patients, 15(21.4%) patients needed invasive mechanical ventilation, 12% needed inotropes and 10% needed non-invasive ventilation. We could identify causative organisms in around 52.8% of patients. *Pseudomonas aeruginosa* (12/37) was the most common organisms isolated. We found that *Pseudomonas aeruginosa* had high resistance to Levofloxacin (94%), Azithromycin (90%), Amikacin (40%) and Piperacillin-Tazobactam(40%).

Conclusion: We found in our study gram negative organisms to be most common organisms causing CAP. *Pseudomonas aeruginosa* was the most common organism isolated in patients admitted to ICU with CAP. We also observed high rate of resistance to commonly used antibiotics.

Introduction

Community acquired pneumonia (CAP) causes significant mortality and morbidity all over the world, especially in developing countries like

India. It is 6th leading cause of death in US^[1] and accounts for over 1.4 million deaths globally. CAP also accounts for poses increased burden on the health care system due to prolonged hospitaliza-

tion and need for ICU in around 25% of these patients.^[2]

Despite recent advances in ventilation strategies and discovery of newer antibiotics, CAP continues to be common and serious illness. With the increase in the comorbidities like diabetes, HIV infection, COPD there has increase in the prevalence of severe pneumonia.^[1,3-5] There is scarce data on the bacteriological profile in patients admitted to ICU from South India so it is necessary to study the clinical and bacteriological profile of these patients for better understanding and treatment of pneumonia.

Methodology

We conducted a prospective study in department of Pulmonology in a tertiary care centre during October to December 2017. Consecutive patients admitted with community acquired pneumonia (CAP) were included in the study after obtaining informed consent. All patients were treated with appropriate antibiotics as per guidelines. Sputum was sent for microbiological analysis before initiation of antibiotics wherever possible.

We defined community acquired pneumonia as new or progressive pulmonary infiltrates on chest radiograph with at least two of the following four: fever, cough, purulent sputum production or leukocytosis over 10,000/mm³.^[6]

Patients with Hospital acquired pneumonia, Health care associated pneumonia were excluded from the study. All patients were interviewed with questionnaire, which included demographic data, risk factors like smoking and alcoholism, comorbidities like diabetes mellitus, cirrhosis of liver and obesity, number of admissions, emergency visits, use of intravenous or oral antibiotics in past, respiratory past medical history such as COPD, bronchiectasis and asthma. Data regarding isolation of pathogenic organisms and source of specimen were recorded and antibiotics used to treat pneumonia within 24 hours of admission were noted.

The Institutional Ethics Committee approved the study. Informed consent from patient/legal

representative was taken prior to inclusion in the study.

Analysis

Descriptive data are presented as frequencies (percentages) for discrete variables and as means (SDs) for continuous variables. Inferential statistics like chi square test was used. All statistical tests were 2-tailed, and factors were considered statistically significant at $p < 0.05$. IBM SPSS version 22 and CDC Epi Info version 7 was used for analysis

Results

During the study period we screened 82 consecutive patients admitted to ICU with pneumonia and 12 were excluded from the study as met exclusion criteria. Finally 70 patients were included into study and were interviewed with questionnaire. Mean age of the cohort was 42.5 ± 10.2 years and 45 (64.28%) of them were men. More than half the population (52%) were chronic smokers and 20% were chronic alcoholics. COPD (20%) was the most common comorbidity followed by diabetes mellitus (18%). Mean BMI of the cohort was 22.8 ± 10 . Of 70 patients, 15(21.4%) patients needed invasive mechanical ventilation, 12% needed inotropes and 10% needed non-invasive ventilation.(Table 1) In 90% of patients sputum was sent for gram stain and culture within 24 hours of admission and blood culture was sent in 12% of patients within 24 hours of admission. Mean duration of hospital stay was 12.5 ± 5 days and we found a mortality rate of 28% in our ICU.

We could identify causative organisms in around 52.8% of patients. *Pseudomonas aeruginosa* (12/37) and *Klebsiella pneumoniae* (8/37) were most common organisms isolated (Figure 1). We found that *Pseudomonas aeruginosa* had high resistance to Levofloxacin (94%), Azithromycin (90%), Amikacin (40%) and Piperacillin-Tazobactam (40%).

Table 1: Demographic details of patients admitted to ICU with CAP

Variables	ICU(70)
Sex, males, n(%)	45(64.28)
Mean age in years, n(SD)	42.5(10.2)
Any comorbidities, n(%)	45(64)
Diabetes ,n(%)	13(18.5)
COPD,n(%)	14(20)
Obesity,n(%)	5(7.1)
Asthma,n(%)	4(5.7)
CKD,n(%)	2(2.8)
HIV,n(%)	2(2.8)
Hypertension,n(%)	5(7.1)
Smoker,n(%)	37(52.8)
Alcoholism,n(%)	14(20)
BMI, mean(SD)	22.8(10)
Duration of hospital stay,mean(SD)	12.5(5)
Mechanical ventilation, n(%)	15(21.4)
Non-invasive ventilation, n(%)	7(10)
Vasopressor usage,n(%)	9(12.8)
EMD visit	10(14.2)
Inhaled steroid	5(7.1)
Organisms isolated	37(52.8)

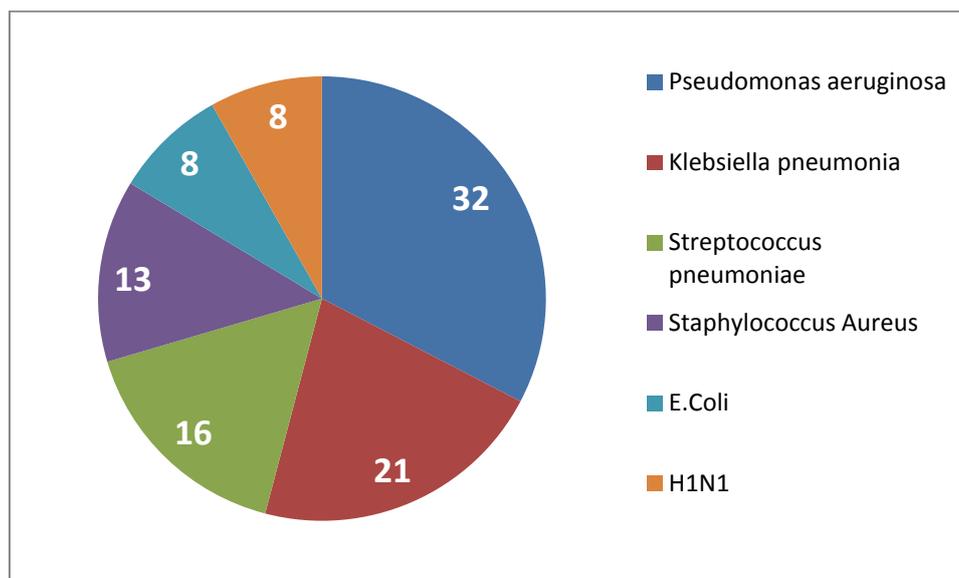


Figure 1: Pie chart depicting proportions of organisms isolated in patients admitted to ICU with CAP

Discussion

Pneumonia is a common and serious illness accounting for significant mortality and morbidity throughout the world. We found in our study, we found etiological diagnosis in around 52% of patients and Pseudomonas aeruginosa was the most common organism isolated with high rate of resistance to commonly used antibiotics.

Isolation of causative organisms could be difficult due to prior use of antibiotics in the periphery before admission to tertiary care centre. However,

we found a higher rates of microbiological isolation compared to studies from Kashmir (29%)^[7] and Ludhiana(47%)^[8] but was lower compared to a study done in Shimla.^[9]

Community acquired pneumonia is commonly caused by Streptococcus pneumonia (20-60%), Hemophilus influenza (3-10%) and Chlamydia pneumonia (4-6%).^[7]

Gram negative organisms are causative organisms in about only 3-10% of patients with CAP. We found Pseudomonas aeruginosa to be most

common organism similar to a study done in Kashmir.^[7] Another study done in Singapore also found Klebsiella to be most common organism causing CAP.^[10] The possible explanation for higher proportion of gram negative infection causing CAP in our study could be due to higher proportion of COPD patients who get recurrent infections and frequently get admitted to hospital requiring antibiotics. This could also explain higher rates of resistance of organisms isolated to routinely used antibiotics.

There were several limitations of our study .First, we did not attempt to isolate anaerobic, fungal and atypical organisms like Chlamydia, Mycoplasma pneumonia. Second, we did not use severity of illness scores like APACHE2 and SOFA score for prognostication of patients. Finally this study has a small sample size and hence results cannot be generalized to general population.

Conclusion

We found in our study gram negative organisms to be most common organisms causing CAP. Pseudomonas aeruginosa was the most common organism isolated in patients admitted to ICU with CAP. We also observed high rate of resistance to commonly used antibiotics.

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