

Clinical and Bacteriological Profile of Community Acquired Pneumonia in Hospitalised Patients in a Tertiary Care Hospital in Puducherry

S. Doraickannu¹, A. Sivaraman², Dasin³, Vithiavathi⁴

¹Associate Professor, Dept. of General Medicine, Aarupadai Veedu Medical College, Pondicherry

²Assistant Professor, Dept. of General Medicine, Indira Gandhi Medical College and Research Institute, Pondicherry

³Post graduate, Dept. of General Medicine, Aarupadai Veedu Medical College, Pondicherry

⁴Professor, Dept. of General Medicine, Aarupadai Veedu Medical College, Pondicherry

Corresponding Author: A. Sivaraman

ABSTRACT

Background: Pneumonia is one of the most important, serious and debilitating infectious diseases, accounting for a considerable number of hospital admissions with an increasing rate of serious complications.

Aim: (i) To study the clinical profile of Community Acquired Pneumonia. (ii) To determine the various predisposing factors. (iii) To identify the most common pathogen causing Community Acquired Pneumonia in hospitalized patients in Aarupadai Veedu Medical College and Hospital, Puducherry (AVMC&H).

Methods: 50 patients with Community acquired pneumonia (CAP) aged more than 18 years were enrolled in this cross sectional study. In all the patients' demographic data and detailed history were recorded followed by complete physical examination, Chest X-ray, blood culture, sputum culture and other investigation wherever applicable in a preformed proforma. The study was conducted between October 2015 to September 2017.

Result: CAP was found predominantly in females (58%) and elderly age group > 50 years (52%). The most common predisposing factors associated with CAP are: type 2 diabetes mellitus (44%), systemic hypertension (28%), bronchial asthma (10%), chronic obstructive pulmonary disease (8%). The commonest mode of presentation was cough with expectoration (100%) followed by fever (80%). Crepitations (84%) were the most common clinical sign. Signs of possibly harmful systemic response were seen in 92% of study group. The commonest organism involved in causing community acquired pneumonia in this study is Streptococcus Pneumoniae (42%) followed by Klebsiella and Pseudomonas aeruginosa (20%). Lobar pneumonia was the commonest radiological presentation.

Conclusion: Streptococcus pneumoniae is the most common pathogen responsible for CAP in this geographical area. Our observations will be useful to help the physicians to start rational empirical treatment for patients with CAP.

Keywords: community acquired pneumonia, etiology, streptococcus pneumoniae, sputum culture.

INTRODUCTION

Pneumonia is a historic disease which has been extensively studied in the last two centuries. Advancements in the field of microbiology and molecular

genetics have greatly improved our understanding about this common illness. Tremendous progress in the field of pharmacology has provided newer agents at our disposal in fighting this illness.

Effective vaccines are now available against two of the most common etiological agents of Pneumonia. Developments in critical care medicine and sepsis management have improved the survival of even severe cases of this disease. Despite all these developments, Pneumonia is still a leading cause of morbidity and mortality across the globe [1]

The true incidence of Community acquired pneumonia (CAP) is not known because of the lack of reporting of this illness and only 20-50 % of the patients require hospitalization. World Health Organization (WHO) global burden of disease study estimated that lower respiratory tract infections (LRTIs), which include CAP, were 429.2 million episodes of illness worldwide and accounts for 94.5 million disability adjusted life years (DALYs) [2]

The two major factors which influence the start of initial therapy are the etiological agent and associated co morbidities. Hence this study was done to study the various etiological agents, and to understand the clinical profile and radiological features of patients presenting with community acquired pneumonia and admitted in Aarupadai Veedu Medical College and Hospital, Puducherry (AVMC & H).

OBJECTIVES

1. To study the clinical profile of Community Acquired Pneumonia.
2. To determine the various predisposing factors.

To identify the most common pathogen causing Community Acquired Pneumonia in hospitalized patients in Aarupadai Veedu Medical College and Hospital, Puducherry

MATERIALS AND METHODS

SOURCE OF DATA

The study comprised of 50 patients over 18 years of age admitted with the diagnosis of Community Acquired Pneumonia to the ward of General medicine in Aarupadai Veedu Medical College and Hospital, Puducherry.

DESIGN OF STUDY

Cross sectional study.

STUDY PERIOD

From October 2015 till September 2017 (2 years)

PLACE OF STUDY

Aarupadai Veedu Medical College and Hospital, Puducherry

The diagnosis of community acquired pneumonia can be made if the patient meets the following criteria (Infectious diseases society of America, IDSA):

Acute infection of pulmonary parenchyma which is associated with onset of at least of one major or two minor findings

(2a) major: cough, purulent sputum production, fever > 38 C

(2b) minor: dyspnoea, pleuritic chest pain, altered mental state, pulmonary consolidation on physical examination total leukocyte count >10,000per cu mm³

Presence of a new or progressive pulmonary infiltrate on chest X- ray. [3]

A detailed history regarding presence of fever, cough, purulent sputum production and pleuritic chest pain was noted from the patients at the time of admission in a proforma. The following investigations were done in all patients: Complete hemogram, Renal function tests, Chest X-ray Postero/Anterior view, Serum electrolytes, Fasting and Post prandial blood sugars, Blood culture and sensitivity and Sputum gram stain and culture sensitivity.

All details were recorded in a proforma. Sputum collection was done at the time of admission for gram staining and AFB staining. Sputum containing more than 25 polymorph nuclear cells and less than 10 epithelial cells per low power field was subjected to gram staining. Sputum was also subjected to bacterial culture on blood agar and MacConkey agar media. In patients who could not expectorate sputum spontaneously, sputum induction was done by three per cent hypertonic saline nebulization. Two samples for blood culture were drawn from two different sites 30 minutes apart and were inoculated over

blood agar and MacConkeys Agar media respectively at 37°C for 24-48 hours. Pleural aspiration for biochemical and microbiological evaluation was done in all cases with pleural effusion.

INCLUSION CRITERIA

1. Patients who are above the age of 18 years admitted in AVMC & H.
2. New and progressive pulmonary infiltrates on chest radiograph with at least two of following four:
 - a. Fever (temperature >37.8°C)
 - b. Production of purulent sputum
 - c. Cough (H/O <4 weeks)
 - d. Leukocytosis (white blood cell count >10,000/cu mm)

EXCLUSION CRITERIA

1. Patients below 18 years of age
2. Patients with tuberculosis and past history of tuberculosis and who are known cases of acquired immunodeficiency syndrome.
3. Patients receiving immunosuppressive treatment.
4. Patients with pulmonary infarction, or history of leukemia.
5. Patient with hospital acquired pneumonia
6. Patient with aspiration pneumonia
7. Patients with occupational lung diseases

The majority of patients were more than 50 years (52%) and the majority of patients were Females (58%). The most common pathogen responsible for CAP in old age (>60) patients was seen that *Pseudomonas aeruginosa* (35.3%) and in between the age groups of 30 – 60 showed *Streptococcus pneumoniae* (Table 1). The most common pathogens isolated among the alcoholics and smokers were *Streptococcus Pneumoniae*(Table 2). The most common comorbidities in patients with CAP is Type 2 Diabetes Mellitus (44%), followed by Systemic Hypertension (28%) (Table 3). All patients in the study group presented with cough and expectoration (100%) followed by fever (80%).

Most Common organism cultured in CAP patients were *Streptococcus Pneumoniae* (42%). Among the gram positive organism grown in sputum of patients with CAP *Streptococcus Pneumoniae* (72.4%) and among gram negative stain sputum included *Klebsiella* and *Pseudomonas Aeruginosa* (47.6%) each. Chest X-Ray showed that majority of patients had Lobar Pneumonia (88%) with predominantly *Streptococcus Pneumoniae* (47.7%) than Bronchopneumonia (12%) with *Pseudomonas Aeruginosa* in majority of patients (83.3%) (Table 4).

RESULTS AND ANALYSIS

Table 1: Age and organism associated

Sl. No	Age in Years	Percentage	Culture & Sensitivity
1	<50 Years	48%	<i>Streptococcus Pneumoniae</i> (23.5%)
3	≥50 Years	52%	<i>Streptococcus Pneumoniae</i> (85.7%)

Table 2: Personal habits and organism associated

Sl. No	Smoking/Alcoholic Characteristics	Percentage	Pathogen in Sputum
1	Smoker	8%	<i>Pseudomonas Aeruginosa</i> (38.5%)
2	Alcoholic	8%	<i>Klebsiella</i> (23.1%)
3	Alcoholic/Smoker	18%	
4	Nil	66%	

Table 3: Chronic Disease and organism associated

Sl. No	Risk Factors	Percentage	Pathogen in Sputum
1	Diabetes Mellitus	44%	<i>Pseudomonas Aeruginosa</i> (50%)
2	Chronic Obstructive Pulmonary Disease	8%	<i>Pseudomonas Aeruginosa</i> (31.8%)

Table 4: Chest X ray findings and organism associated

Sl. No	Chest X-Ray Findings	Percentage	Culture & Sensitivity
1	Lobar	88%	<i>Streptococcus Pneumoniae</i> (47.7%)
2	Bronchopneumonia	12%	<i>Pseudomonas Aeruginosa</i> (83.3%)

DISCUSSION

Pneumonia (also called as the winter fever), derived from the Greek word *pneuma*, meaning “breath”, is a disease known to mankind from antiquity. [4]

Community-acquired pneumonia (CAP) is commonly described as an acute infection of the lung parenchyma acquired in the community. Pneumonia is defined as an infection of the pulmonary parenchyma. [5]

The *British Thoracic Society (BTS)* Guideline for diagnosing CAP is as follows:

- a. Symptoms of an acute lower respiratory tract illness (cough with or without expectoration, shortness of breath, pleuritic chest pain) for less than 1 week; and
- b. At least one systemic feature (temperature $>37.7^{\circ}\text{C}$, chills, and rigors, and/or severe malaise); and
- c. New focal chest signs on examination (bronchial breath sounds and/or crackles) with
- d. No other explanation for the illness

Along with, new radiographic shadowing in the form of a lobar or patchy consolidation, loss of a normal diaphragmatic, cardiac or mediastinal silhouette, interstitial infiltrates, or bilateral perihilar opacities, with no other obvious cause. [6]

Studies conducted by Archana Choure et al. [7] and Jain SK et al. [8] have found that CAP occurs more in the elderly age group population (>50 years) (84.28% and 68.3% respectively). This study is similar to our study where majority of patients with CAP were >50 years (52%).

In our study 18% were both alcoholics and smokers and 8% had one of the above habits. The most common pathogen isolated in the sputum of alcoholic patients was *Klebsiella* (46.2%) and in the sputum of smokers *Pseudomonas Aeruginosa* (38.5%) which was in accordance with studies conducted by Antoni Torres et al [9] and Bello S et al. [10]

The commonest pathogen isolated in sputum of COPD patients in our study was *Pseudomonas Aeruginosa* (50% which was

similar to study by Liapikou et al [11] and among patients with type 2 diabetes mellitus was *Pseudomonas Aeruginosa* which was in accordance with a study conducted by Jayant B. et al. [12]

Chest X- ray in patients with CAP revealed that the most common presentation was a lobar pneumonia (88%) rather than a bronchopneumonia (12%) picture in our study which was similar to study conducted by S K Jain et al. [8]

CONCLUSION

The study was undertaken in Department of Medicine of Aarupadi Veedu medical college and hospital with aim of knowing the prevalence of etiological microorganism of CAP, clinical presentation of patients, and correlation with causative micro-organism.

The commonest organism involved in causing community acquired pneumonia in our setup was *Streptococcus Pneumoniae*. In which middle aged women (30 and 60years) were most commonly affected.

Pseudomonas aeruginosa was the commonest organism isolated in diabetics, COPD and smokers whereas in alcoholics, *Klebsiella* was the commonest organism with fever and cough with expectoration as most common presentation.

Careful history elicitation and examination will help in identifying high risk patients and provide early intervention. Despite the recent advances in diagnostic techniques, isolation of pathogen in sputum remains pivotal in establishing the aetiological diagnosis and in initiating treatment with appropriate antibiotics at the earliest in pneumonia.

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