Original Research Article

Outcomes of community acquired pneumonia in a tertiary hospital

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ABSTRACT

Introduction: Despite the advances in healthcare setup, Community Acquired pneumonia still continues to be one of the major causes of morbidity and mortality among the hospitalised, especially the elderly population. Knowledge about the distribution of the disease, susceptible population, risk factors, mortality and morbidity outcomes makes it easy for the effective management of the affected individuals. Even though we have enough data on worldwide distribution and outcome of CAP, similar studies in Indian setup are few. Considering the fact that the change in environment, population characteristics and difference in clinical practices can hugely influence the outcome of CAP, it was found necessary to conduct this study.
Aim: To understand the demographic profile of patients, to identify the main symptoms and risk factors and to find out the outcome of patients admitted with CAP in a tertiary health care centre in Thrissur.
Materials and Methods: Retrospective study by collecting the details of patients hospitalized with CAP in the past one year by going through their medical records.
Results and Conclusion: The incidence of CAP was found to be steadily increasing with age, more in males with productive cough being the most common symptom. While in majority of cases no organisms were isolated, the ones which had an identified causative organism were mainly bacterial. Maximum cases occurred in monsoon season and the mortality rate was 2%.

1. Introduction

Community Acquired Pneumonia [CAP] still continues to be one of the major public health concerns across the world due to its high incidence and considerable mortality & morbidity rates, especially in elderly population, despite the advances in healthcare systems and development of effective anti-microbial agents.[1] Advanced age is associated not only with higher incidence of CAP but also with more severe disease, greater need for hospitalization and higher mortality.[2,3]

The aetiology of CAP has been well established, the commonest being Streptococcus pneumoniae and risk factors being increasing age, smoking, and other co-morbidities like Diabetes Mellitus, Chronic Obstructive Pulmonary disease & Chronic Kidney disease.[4] The very high incidence of CAP and its common complications like para-pneumonic effusion, sepsis and need for admission to intensive care unit, makes it important for all physicians to have a good understanding of the disease. Better understanding of the pattern of the disease and the risk factors that are associated with fatal complications will allow us to be better prepared in order to identify and provide the best possible treatment to the patients that would limit the morbidity and reduce the mortality especially in the

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elderly population.

Although there are several studies around the world based on the distribution and outcomes of CAP, similar ones on Indian setting, especially in tertiary healthcare centres, are few in number. The regional changes, environment and standard of healthcare practices have a huge impact on incidence and outcome of the disease. Also the clinical practice is different at different levels of healthcare in the country.

Taking this into consideration, it was decided to conduct the following study in order to identify the outcomes of CAP and its demographic distributions in patients admitted to a tertiary health care centre.

2. Aims

To determine the outcome of patients hospitalized with CAP in the year 2018 in a tertiary care hospital (Amala Institute of Medical Sciences - AIMS) in the Thrissur district of Kerala, India.

3. Objectives

1. To understand the demographic profile of patients hospitalized with CAP in a tertiary health care centre.
2. To identify the major symptoms and risk factors associated with patients hospitalized with CAP.
3. To find out the seasonal variation in hospitalization of patients with CAP in a tertiary health care centre.
4. To find out the outcome of patients hospitalized with CAP in a tertiary health care centre.

4. Materials and Methods

The study was carried out by conducting a retrospective analysis to evaluate the outcomes of patients hospitalized with the primary diagnosis of CAP in AIMS, Thrissur for a period of 1 year. The data was collected by going through the medical records of patients diagnosed with Pneumonia obtained from the Medical records department in AIMS, Thrissur. The study was made specific to CAP by excluding other forms of pneumonia.

Community-acquired pneumonia (CAP) is commonly defined as an acute infection of the lower respiratory tract occurring in a patient who has not resided in a hospital or healthcare facility in the previous 14 days.[9] Patients were included in the study if they had a primary diagnosis of CAP irrespective of age, gender, race or residence and hospitalized for the same, whether it be in the ward, room or ICU. Patients who were also diagnosed with malignancy, stroke, the immunosuppressed or those on immunosuppressive drugs, on dialysis and those who developed features of pneumonia while being hospitalized for another illness or were bed ridden were excluded from the study. Paediatric cases were also excluded from the study. For the purpose of assessing the seasonal variation,

summer was taken as the months March till May, monsoon as June till October, and winter as November till February.

The demographic characteristics of the patients, duration of hospital stay, symptomatology, comorbidities, seasonal variation, radiological features, complications, outcome and causative organisms were analysed. The peak season of CAP could be identified along with the months that showed a significant increase in cases. The changes in the frequency of admissions for CAP was noted and also correlated with the severity of the pneumonia including those that required ICU care. The other variables observed were studied to find out if there was an association between them and the incidence of pneumonia.

4.1. Inclusion criteria

All hospitalized cases of Community Acquired Pneumonia as primary diagnosis (irrespective of age, gender, race, residence).

4.2. Exclusion criteria

Any pneumonia other than Community Acquired Pneumonia.

Patients diagnosed with malignancy, stroke, immune suppressed or on immunosuppressive drugs, on dialysis (to avoid inclusion of Nosocomial Pneumonia, Health Care Associated Pneumonia, Aspiration Pneumonia).

Patients who developed pneumonia while admitted in the hospital.

Paediatric patients less than or equal to twelve years of age.

The quantitative variables were expressed as mean or standard deviation [SD] and median or inter-quartile range [IQR]. Qualitative variables were expressed as percentages.

5. Results

There was a total of 78 medical records involving pneumonia cases in 2018 (excluding paediatric cases). Out of these, 47 cases which were fitting into our criteria were analysed and included in the study.

Out of the 47 patients, 27 were males (57%) and the remaining 20 were females (43%). [Table 1]. Out of these 27 males, 15 were smokers. None among females were smokers.

Table 1: Demographic distribution

Demographic Variable	Category	Frequency	Percentage
Gender	Male	27	57.4
	Female	20	42.6
Age	12-24	10	21.3
	25-44	12	25.5
	45-64	14	29.8
	>64	11	23.4

The distribution of age of patients admitted with CAP in 2018 is shown in the bar chart below. It was found that the maximum number of CAP cases admitted was in the age range of 45-64 years, (N=14, 29.8%), 10 were aged between 12-24 years (N=10, 21.3%), 12 between 25-44 years (N=12, 25.5%) and 11 patients were 65 years old or more (N=11, 23.4%).

The maximum age of a patient admitted with CAP during the study period was 89 years, minimum was 14 years, with mean age being 47.68 years.

Table 2: Age distribution of CAP cases

	Mean (SD)	Median (IQR)	Maximum	Minimum
Age (in years)	47.68(20.09)	48	89	14
Duration of stay (in days)	5.83(3.14)	5	15	1
Duration of fever (in days)	14.98(36.74)	5	18	1

The maximum duration of stay for patients hospitalized with CAP during the study period was 15 days and minimum was 1 day, with a mean of 5.83 days of hospital stay. [Table 2]

Fever persisted in patients hospitalized with CAP for a maximum of 18 days and a minimum of 1 day, with the mean duration of fever being 14.98 days.

Table 3 - Symptomatology of patients hospitalized with CAP.

Out of the 47 patients, 14 had no fever, 23 had high grade fever, while the remaining 10 had low grade fever. Also the disease was associated with productive cough in 37 patients while the other 10 had either non-productive cough or no cough at all. [Table 3]

Lobar consolidation was seen in 30 patients (64%) admitted with CAP while the remaining 17 had bronchopneumonia (36%). [Figure 1]
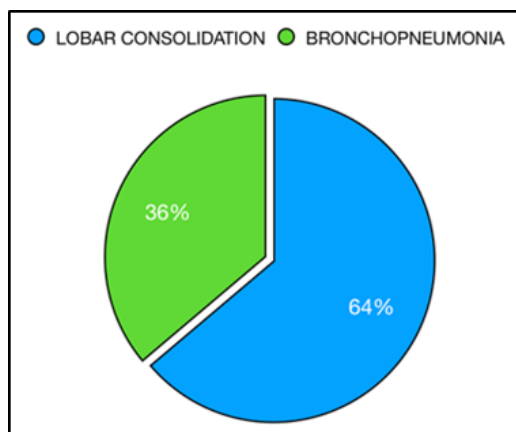

Fig. 1: Radiologicl pattern

Involvement of Left lung was seen in 17 patients (36.2%) while Right lung involvement was seen in 19 patients (40.4%). 11 of the patients admitted with CAP had Bilateral lung involvement (23.4%). [Figure 2]
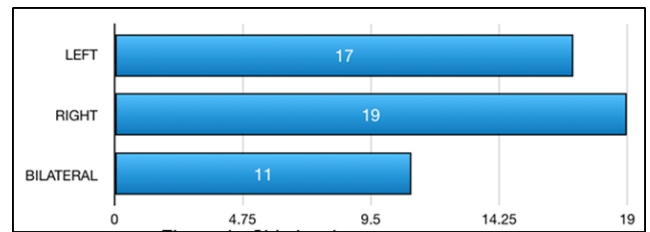

Fig. 2: Side involvement

Out of the 47 patients who took part in the study, 10 had Hypertension or Diabetes Mellitus, 9 had Respiratory co-morbidities. Two of them had both Hypertension/Diabetes and respiratory co-morbidities while the remaining 26 had no co-morbidities. [Figure 3]
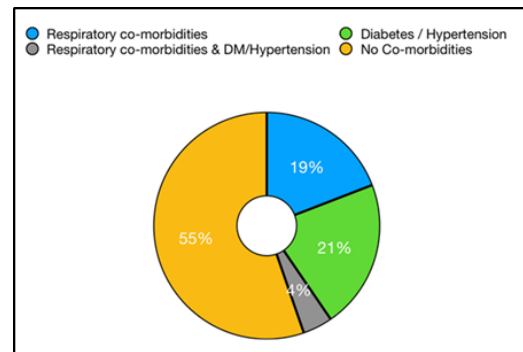

Fig. 3: Co-morbidities

Pleural effusion was seen as complication in 9 of the patients. One patient developed Respiratory failure while another one had respiratory distress. Complications developed in eleven patients. No complications were noted in the remaining 36 patients hospitalised with CAP. [Table 4]

Table 3: Complications of CAP

Complications	Number of patients	Percentage
Pleural effusion	9	19.2
Respiratory failure	1	2.1
Respiratory distress	1	2.1
No complications	36	76.6

Out of the 47 patients with CAP, 26 admissions occurred during Monsoon season, 16 during Winter season and the remaining 5 admissions occurred during Summer. [Figure 5]

Steroids were used in treatment for 11 patients admitted with CAP (co existing obstructive airway disease, suspected
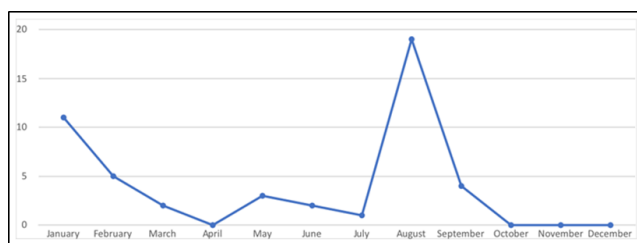
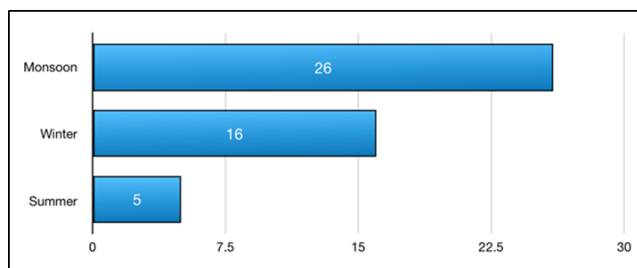**Fig. 4:** Monthly distribution of CAP cases

Fig. 5: Seasonal Variation of admission of Patients with CAP.

viral etiology, features of Sepsis with shock or ARDS) while steroids were not used for the remaining 36.

The causative agent in 14 cases of CAP was Bacteria, 2 cases had Viral aetiology, 2 of them were caused by Fungi and Mycoplasma each. The bacterial pathogens were Haemophilus Influenzae, Streptococcus Pneumoniae, Klebsiella and Pseudomonas. Virus was Influenza virus in one case. The other viral pneumonia was diagnosed on clinicoradiological grounds. No specific aetiology was observed in 26 patients admitted with CAP. [Table 4]

Table 4: Causative agent of CAP

Causative agent	Number of patients	Percentage
Bacterial	14	29.78
Viral	2	4.25
Fungal	2	4.25
Mycoplasma	2	4.25
Other	1	2.13
Non - specific	26	55.32

Out of 47 patients admitted with CAP, 6 were cured with disability (13%), 40 were completely cured (85%) while one patient could not survive (2%). [Figure 6]

6. Discussion

The study gives a novel insight to the demographics of patients hospitalised with CAP in a tertiary care centre in India and their clinical course and outcome. CAP is a major cause of mortality and morbidity in current world, especially among elderly and in patients with chronic diseases.

The mean age of patients in our study 47.68 +/- 20.09 of which 11 are >64 years of age. In a study by S Bansal
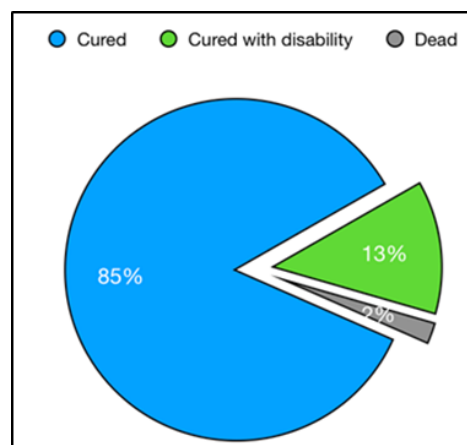

Fig. 6: Outcome of patients admitted with CAP

et al, 42% of the total 70 patients in the study were >60 years old while another study done by Aroma et al had the mean age as 40 years.[5] The incidence of CAP has a steady increase with age in most of the studies conducted throughout the world, the probable reason being impaired mucociliary clearance, decreased effectiveness of cough due to weaker respiratory muscles, underlying co-morbidities and impaired cell mediated and humoral immunity, which makes the elderly more prone for infections.

In our study, 57% were males and the remaining 43% were females. The higher incidence in males may be attributed to increased incidence of smoking in men and occurrence of the resultant co-morbidities like COPD, which impairs the body's defence mechanisms and makes the patient more susceptible to infections.

Among the 47 patients in this study, productive cough was the most common respiratory symptom noted (78.7%), which is similar to the study by Bilal et al.[6] There was no much difference between symptoms of viral or bacterial pneumonia in our study. Similar findings were observed in the study by Oberoi et al.[7]

The rate of isolation of organisms from blood or sputum cultures was 44.6%, which is slightly more than the culture positivity rates in previous Indian studies (10-33%).[8] Blood culture positivity was found to be low in most of the studies including the one by Oberoi et al, in which it was 22%.[7] Prior use of Antibiotics, non-productive cough, improper methods of collection for culture and absence of specific tests to detect certain viral pathogens could be the reason for the low rate of isolation of the causative organism.

In a study by Oberoi et al, AFB was identified in 5% cases presenting as acute pneumonia in India[7] while our study showed none. Streptococcus pneumoniae has been identified as the most common causative organism causing CAP worldwide.[9,10] while recent studies over past 3 years have reported a higher incidence of gram negative organisms in culture positive CAP.[11] The occurrence of

Mycoplasma pneumonia in our study was 4.25% while some studies like the one by Dey et al had high incidence of Mycoplasma up to 35%.[12] The incidence of fungal pneumonia was also 4.25% which may be attributed to the increasing prevalence of Diabetes Mellitus and immunosuppression.

In our study, maximum number of cases occurred during monsoon season (55.3%). In a study conducted by Lieberman et al, 34% of cases occurred during spring season.[13] The mortality rate of CAP in various hospital-based studies is highly variable from being 5.7% in a British Thoracic Society multi-centric study[16] to about 20 - 25% in others.[14] The mortality rate in our study was 2%. The mortality rates may vary depending upon the age of the patient, pre-existing illnesses, effectiveness of antibiotic therapy and standard of healthcare provided.[15–17]

7. Conclusion

Community Acquired Pneumonia is still one of the major illnesses causing morbidity and mortality especially in elderly. Incidence of CAP was found to be increasing steadily with age, more in males than females. Productive cough was the most common symptom and most of the cases resolved without any complications. Most of the cases which had an identified causative organism were bacterial, while in majority of cases, no organism was isolated. Maximum cases occurred in monsoon season and the mortality rate was 2%.

8. Acknowledgement

9. Conflicts of Interest

The authors have no conflict of interest to declare.

10. Source of Funding

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