

To study the clinico-radiological features and associated co-morbid conditions in community acquired pneumonia in RIMS Medical college & Hospital, Kadapa, Andhrapradesh, India

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Abstract: Background : Pneumonia has been referred to as captain of men of death in the past. Community acquired pneumonia (CAP) remains a common and serious illness with a significant morbidity and mortality in the 21st century, despite the availability of potent antibiotics .Short duration of the illness and effectiveness of treatment are major positive aspects of management of community acquired pneumonia (CAP).pneumonia is the most common cause of hospital attendance in adults. Aetiology of half of all patients with CAP remains uncertain. The relative frequency of etiological agents varies among different geographical areas.

Material and methods : The study comprises of all patients over 15 years of age with the diagnosis of community acquired pneumonia presenting to the Department of Pulmonary medicine RIMS Medical college kadapa during period from Apr 2017 to May 2018.

Conclusion: The age group in the study varied from 15 – 85 years, most of them were >40 years, constituting 61 %.The incidence of CAP is more common in men (68%), when compared with women (32%).COPD is significantly associated with CAP. The common risk factors for CAP were smoking and alcoholism. The commonest presenting symptoms were fever (99 %), cough (98 %) and expectoration (98 %), Streptococcus pneumoniae is the commonest cause in 17 (34%) of cases. In the chest x ray, lobar pneumonia is the commonest pattern, seen in 70 %.

Keywords: CAP, copd, chest x ray,AFB,sputum culture.

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I. Introduction

Pneumonia has been referred to as captain of men of death in the past. Pneumonia is defined as the inflammation and consolidation of the lung parenchyma due to an infectious agent¹.Community acquired pneumonia (CAP) remains a common and serious illness with a significant morbidity and mortality in the 21st century, despite the availability of potent antibiotics .Short duration of the illness and effectiveness of treatment are major positive aspects of management of community acquired pneumonia (CAP).pneumonia is the most common cause of hospital attendance in adults. True incidence of community acquired pneumonia (CAP) in India is exactly not known. Overall estimates of annual incidence of community-acquired pneumonia vary between 2 and 12 cases per 1000, being highest in infants and in the elderly. Mortality rates are less than 1–5% in the outpatient setting, but as high as 12% in hospitalized patients. In 2010, pneumonia and influenza-related deaths were ranked as the ninth-leading cause of death among all age groups in the United States, leading to approximately 50,000 deaths in 2010, and the top cause of infection-related mortality² Etiological evaluation of pneumonia is important as it decides subsequent management strategies. Unfortunately Indian studies on pneumonia are deficient in this aspect. Sputum collection is the simplest test enquiring about specific aetiology of pneumonia but it is often overlooked in our primary care settings. Aetiology of half of all patients with CAP remains uncertain. Physicians need reliable data on the relative prevalence of different etiological agents in the patients' area of residence, in addition to the clinical, laboratory and radiological findings in order to initiate antibiotic treatment empirically. The relative frequency of etiological agents varies among different geographical areas.

II. Materials And Methods

The study comprises of all patients over 15 years of age with the diagnosis of community acquired pneumonia presenting to the Department of Pulmonary medicine RIMS Medical college, kadapa. Community acquired pneumonia is defined as new and progressive pulmonary Infiltrates on chest radiograph with at least

two of the following four, Fever, Cough, Purulent sputum and Leucocytosis over 10,000 cells per cubic mm. Patients with radiological and lab evidence of Tuberculosis, pulmonary infarcts, Leukemia, AIDS, Lung cancer, patients on immunosuppression therapy and other co-existing pulmonary diseases are excluded from the study. A detailed history at the time of admission, complete hemogram, chest x-ray PA view, FBS, Renal function test for all patients. Sputum collection at the time of admission for gram staining and AFB staining, Sputum for culture and sensitivity. Sample for blood culture drawn from two different sites 30 minutes apart and were inoculated over blood agar and Mac Conkeys agar media for 24-48 hours.

III. Results

A prospective clinical study consisting of 100 Community Acquired Pneumonia (CAP) patients, who were admitted in Department of Pulmonary medicine. RIMS Medical college, kadapa during Apr 2017 to SEPT 2017 is undertaken to study the clinical, radiological and bacteriological profile. The study group consists of 100 patients, out of which 68 (68%) were males and 32 (32%) were females. Patients of age 15 – 85 were included in this study. The mean age is 48 ± 16.6625 . Maximum number of patients were in the age group 41 – 50 years and 51- 60 years constituting 21% each. Patients above 40 years constitute 61% of CAP. All patients had fever, cough and expectoration (98%), majority (70%) had chest pain and an equal number had dyspnoea. COPD is the most common and statistically significant co morbid condition associated with CAP ($p < 0.001$). Diabetes is present in 6 % of cases, hypertension in 5 %, chronic kidney disease in 1 % of cases. Smoking is the most common risk factor associated with CAP ($p < 0.05$), accounting for 60 % of the cases. Alcoholism is associated with 45 % of CAP. 22 % of the study group were anaemic and 4 % had clubbing. Most of the patients presented with tachypnoea (85%) and tachycardia (80%), 3% of the study group presented with hypotension and 18 % with respiratory failure. CURB-65 is used to assess the severity Confusion at the time of presentation is seen in 3 (3%), uremia in 1 (1%), tachypnoea in 85 (85%), hypotension in 3 (3%), and age > 65 years in 16 (16%) of cases. Mild (0 – 1 score) is seen in 82 (82%), moderate (2 score) in 14 (14%), severe (4%) of cases. The mean haemoglobin value is $10.249 \text{ g/dl} \pm 1.59$. The mean total leucocytic counts were $10,704 \pm 3302.34$. Among the leucocytes the neutrophils mean value is 74.82. The total WBC counts varies from 4,500 – 21,500. The sputum gram staining predominantly showed gram positive cocci 50 % ($p < 0.001$) 40 % showed gram negative organisms. 5 % were sputum positive for AFB and 5% showed mixed organisms. Sputum culture showed positive results in 50 (50%) patients, out of which *streptococcus pneumoniae* is the predominant organism constituting 17/50 (34%), *klebsiella* in 10/50 (20%) patients, *pseudomonas* in 8/50 (16%), *staphylococcus* in 7/50 (14%), *E.coli* in 6/50 (12%) patients. Blood cultures were positive in only 30 (30%) patients. *Streptococcus pneumoniae* was isolated in 12/30 (40%) patients, *klebsiella* in 8/30 (26.6%), *staphylococcus* in 4/30 (13.33%), *pseudomonas* in 4/30 (13.33%), *E coli* in 2/30 (6.66%) patients. Lobar consolidation was identified in 76 (76%) patients ($p < 0.001$), bronchopneumonia in 20 (20%) patients, interstitial pattern in 4 (4%) patients. COPD changes were noted in 20 (20%) patients. Right lung is involved in 60 (60%) patients ($p < 0.001$), left lung in 36 (36%) patients, bilateral involvement in 4 (4%) patients. Right upper lobe is involved in 18 (18%), middle lobe in 14 (14%), lower lobe in 28 (28%), left upper lobe in 12 (12%), lingula in 10 (10%), and lower lobe in 18 (18%) patients. Complications were seen in 34 (34%) cases. Synpneumonic effusions were seen in 26 (26%), respiratory failure in 12 (12%), ARDS in 6 (6%), Empyema in 5 (5%), lung abscess in 2 (2%), sepsis in 3 (3%) patients. Synpneumonic effusions were common in > 40 years age group patients (18 out of 26).

IV. Discussion

I. CAP is a common serious medical problem all over the world with significant morbidity and mortality. It ranks as the sixth leading cause of death in US. In developing countries like INDIA, pneumonia is recognised as the most common cause for hospitalisation and remains a leading cause of death. Despite the fact that the etiological agent in 50 % of CAP is unknown and the management of CAP is based on empirical antibiotics. It is observed in various clinical trials that the aetiological agent varies from one geographical area to another geographical area. The present study is undertaken to determine the etiological agents in this geographical area, and also to study the clinical and radiological profiles, co morbid conditions and complications in the patients with CAP who attended to our hospital, The present study group consists of 100 patients. The mean age is 48.66 years ($SD \pm 16.66$). In the present study, patients older than 40 years were more prone to CAP. In the study of SHAH & OTHERS³ it was found that patients > 40 years were more prone to CAP. The results of our study resemble that of above mentioned study. This can be attributed to the increased prevalence of smoking and COPD in this age group. In the present study majority were males constituting 68% and females were 32%. In the study of S.BANSAL et al⁴ and BILAL BIN ABDULLAH et al⁵ they have found that 71 % were males and 29 % were females. The present study is on par with their study. This can be attributed to the habits of smoking and alcoholism in men which predisposes to CAP. In the present study 32

patients were associated with co morbid conditions, Out of which COPD is the commonest condition accounting for 20%. In the study of S. BANSAL et al, COPD is the common co morbid condition associated with CAP in 47 % of cases. In the study of P. MOINE et al, COPD is the common co morbid condition seen in 39 % of cases. This is due to the fact that COPD patients had altered cellular and structural abnormalities in the lung. The change in the bacterial flora in these patients is well supported by ineffective coughing and advanced age predisposes them to pneumonia. In our study smoking and alcoholism are the most common risk factors associated with CAP. Smoking accounts for about 60 % in our study. SHAH et al³ in their study found that smoking is the common risk factor associated with CAP constituting 65 %. In the present study almost all patients presented with fever, and cough with expectoration. Dyspnoea and chest pain is present in 70 % of patients. SHAH et al³ in their study found that most of the patients presented with fever (95%), cough (99%). S. BANSAL et al⁽⁴²⁾ in their study found that fever (90%), cough (97%), expectoration (87%) were the common presenting symptoms of CAP. Our study is on par with their studies. In our study pallor is present in 22 % of patients. Clubbing is present in 4 % of patients. In the present study tachypnoea is present in 85 % , tachycardia in 80 %, hypotension in 3 % of patients. These results are slightly comparable to those of BILAL BIN ABDULLAH et al⁵ study. S. BANSAL et al⁴ in their study found that tachypnoea is present only in 24 % cases and hypotension in 13 % cases. SHAH et al³ in their study found tachycardia in 92 % of cases. S_p O₂ was recorded in all patients at the time of admission. S_p O₂ <90% was found in 18 % of cases. In our study the respiratory system findings includes bronchial breath sounds in 90% cases, ↑VF in 90% cases, ↑VR in 90%, WP in 20% cases and Crepitations in 25 % cases. In the study by BIN BILAL ABDULLAH et al⁵ also most common finding was crackles in 94% and bronchial breath sounds observed in 24%. In S. BANSAL et al⁴ study, crepitations were heard in 98 % of cases and bronchial breath sounds in 47 % cases. In our study the mean haemoglobin is 10.24 g/dl, and the range is 6 – 13 g/dl. The mean total leucocyte count is 10,704, and the range is 4,500 – 21,500. The mean random blood sugar is 100.23, and the range is 68 – 165 mg/dl. The mean blood urea is 22.03, and the range is 14 – 40 mg/dl. The mean serum creatinine is 1.06 and the range is 0.6 – 2.5 mg/dl. 28 cases had total leucocyte counts > 11,000. In our study, bacteriological positivity obtained in 60%. Gram +ve organisms (30%) were more common than gram –ve organisms (24%). These results were similar to those of BILAL BIN ABDULLAH et al⁽⁴³⁾ study where gram +ve organisms were found in 32 % of cases and gram –ve organisms in 12 % of cases. In our study sputum cultures were positive in 50 % of cases, out of which streptococcus pneumoniae accounts for 17 cases (34%), klebsiella for 10 cases (20%), staphylococcus for 7 cases (14%), E.coli for 6 cases (12%), pseudomonas for 8 cases (16%). In the study of S. BANSAL et al⁴ streptococcus pneumoniae is the commonest organism accounting for 35.8 % followed by klebsiella for 22 % cases. Our study results are on par with theirs. In the study of BILAL BIN ABDULLAH et al,⁽⁴³⁾ which concerns elderly patients, also Sputum culture results showed streptococcus pneumoniae as most common followed by klebsiella, pseudomonas, H.influenza. In our study blood cultures were positive in 30 % cases. Streptococcus pneumonia was the commonest organism in 12 cases. Klebsiella is the next common organism in 8 cases. Our results are similar to the results of MOINE et al⁶ study of CAP, in which blood cultures were positive in 27 % cases, in which streptococcus pneumoniae is the commonest organism. In a study of 66 patients by MARIA RITA et al,⁷ BRAZIL, blood cultures were positive in only 8.2%. In most of the studies done worldwide, streptococcus pneumoniae is the commonest organism causing CAP. Combining the sputum gram staining, sputum culture and blood culture results the aetiological agent in our study is identified in 50 % of cases, of which streptococcus pneumonia is the commonest organism. The pleural fluid and the pus from pleural cavity doesn't yield any result in our study. Chest X ray is necessary to establish the diagnosis of pneumonia. Radiographic changes usually cannot be used to distinguish bacterial from non bacterial pneumonia, but they are often important for evaluating the severity of illness, determining the need for diagnostic studies and selecting antibiotic agent. In the present study bilateral involvement is seen in 4 % of cases and unilateral involvement in 96 %, out of which right lung in 60 % and left lung in 36 %. Lobar pneumonia is seen in 76 %, bronchopneumonia in 20 %, interstitial pneumonia in 4 % cases. In the study of S. BANSAL et al,⁴ lobar pneumonia is seen in 80 %, interstitial pneumonia in 20 %. In the study of RUIZ, EWIG, MARCOS et al,⁽⁴⁶⁾ lobar pneumonia is seen in 77 %, interstitial pneumonia in 2 %, mixed alveolar and interstitial in 22 %, bilateral involvement in 19 %. In our study right lower lobe is commonly involved 28 %, followed by right upper lobe in 18 %, left lower lobe in 14 %, right middle lobe in 14%, left upper lobe in 12 %, lingual in 10 %. In our study complications were seen in 34 % of cases. synpneumonic effusions were seen in 26 % of cases. Very similar to our results, in the study of MOINE et al,⁶ synpneumonic effusions were seen in 23 % of cases. In the study of S. BANSAL et al,⁴ synpneumonic effusions were seen in 10 % of cases. In our study 6% cases were complicated by ARDS, sepsis and septic shock in 3%, empyema in 5%, lung abscess in 2% of cases. In our study all the patients were treated with antibiotics. Antibiotics were required alone in 66% of cases. . Prolonged treatment is required in patients complicated by empyema, lung abscess, pleural effusions. In 5% of cases antibiotics along with intercostal tube drainage is required. 3% of cases with ARDS required invasive ventilator support. Fluid resuscitation along with vasopressors is required in 3% of cases with sepsis and septic shock. In our study outcome is very good. The mortality is only 3 %. In the study of WOODHEAD et al,⁹ the

mortality was 3%, our study is on par with his study. The remaining patients recovered from the illness, including the complicated cases. All the 3 dead patients were males, 2 were smokers, 2 were alcoholics, 1 had COPD. All those 3 patients had positive blood cultures which isolated staphylococcus aureus, E.coli and pseudomonas in one case each. All those 3 patients presented with ARDS, sepsis and septic shock. The patient with staphylococcal pneumonia was given anti staphylococcal antibiotics after the obtaining the culture reports. The presence of MODS and sepsis caused the patient's death despite initiation of anti staphylococcal antibiotics. The mortality is associated with male gender, smoking, alcoholism, bacteremia, septic shock, ARDS, requirement of invasive mechanical ventilation. The CURB-65 score is a very sensitive indicator for mortality. Out of 4 patients with score ≥ 3 , 3 died. Remaining patients recovered. In our study the serological tests for the diagnosis of CAP were not performed due to lack of facilities. So the aetiological diagnosis for atypical organisms, certain viruses was not obtained. Hence the aetiology was obtained in only 50% cases in our study.

V. Figures And Tables

Table 1

AGE IN YEARS	MALES	FEMALES	TOTAL (n = 100)
15 – 20	6 (6%)	3 (3%)	9 (9%)
21 – 30	10 (10%)	3 (3%)	13 (13%)
31 – 40	9 (9%)	8 (8%)	17 (17%)
41 – 50	15 (15%)	6 (6%)	21 (21%)
51 – 60	15 (15%)	6 (6%)	21 (21%)
61 – 70	10 (10%)	2 (2%)	12 (12%)
71 – 80	3 (3%)	2 (2%)	5 (5%)
>80	2 (2%)	0	2 (2%)
	68(68%)	32(32%)	100 (100%)

Table 2: Comorbidities At The Time Of Presentation

Comorbidity	TOTAL
Copd	20 (20%)
Diabetes	6 (6 %)
Hypertension	5 (5 %)
Ckd	1 (1 %)

Table 3 : Risk Factors Associated With Cap

Risk Factor	TOTAL(n =100)
Smoking	60 (60%)
Alcoholism	45 (45%)
Drug Abuse	0

Table 4- Sputum Culture Results

Organism	Number(N=50)
Streptococcus	17 (34%)
Klebsiella	10 (20%)
Pseudomonas	8(16%)
Staphylococcus	7(14%)
E Coli	6(12%)

Table5- Blood Culture Results

Organism	Number (N=30)
Streptococcus	12 (40%)
Staphylococcus	4 (13.3%)
Klebsiella	8 (26.6%)
Pseudomonas	4 (13.3%)
E Coli	2 (6.6%)

Table 6 – Radiological Patterns

Radiological Pattern	Number(N=100)
Lobar Consolidation	76 (76%)
Bronchopneumonia	20 (20%)
Interstitial Pneumonia	3(4%)

VI. Conclusion

The age group in the study varied from 15 – 85 years, most of them were >40 years, constituting 61 %.The incidence of CAP is more common in men (68%), when compared with women (32%).COPD is significantly associated with CAP.The common risk factors for CAP were smoking and alcoholism.The commonest presenting symptoms were fever (99 %), cough (98 %) and expectoration (98 %), other symptoms include dyspnoea (70 %) and chest pain (70 %).The signs of consolidation – bronchial breath sounds, ↑VF, ↑VR were present in 90 % of patients. Added sounds – crepitations were present in 25 %.The haematological findings showed neutrophilic leucocytosis (73.82 %).Combining the sputum staining, sputum cultures and blood cultures, the aetiological agent was obtained in 50 % of cases. *Streptococcus pneumoniae* is the commonest cause in 17 (34%) of cases, *klebsiella* in 10 (20%) of cases *pseudomonas* in 8 (16%) of cases, *staphylococcus* in 7(14%) of cases, *E.coli* in 6 (12%), and *Mycobacterium tuberculosis* in 2 (4%) of cases. In the chest x ray, lobar pneumonia is the commonest pattern, seen in 70 % .Complications were seen in 34 cases out of which 3 were died. Most of the patients responded to antibiotics alone. Prognosis was good in this study. CURB- 65 score is a very sensitive indicator for the assessment of severity and predicting the mortality. The mortality was associated with male gender, COPD, smoking, alcoholism, bacteremic pneumonia, septic shock, ARDS, requirement of invasive mechanical ventilation. It requires further studies to establish the aetiology of CAP.

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