Pulmonary Medicine

CLINICO-RADIOLOGICAL AND BACTERIOLOGICAL PROFILE OF COMMUNITY ACQUIRED PNEUMONIA

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ABSTRACT

BACK GROUND: Pneumonia is one of the leading causes of mortality and morbidity in India despite the availability of several antibiotics. In the past few years, several guidelines were developed for systematic approach in the management of community acquired pneumonia (CAP).

METHODS: we conducted a retrospective study (December 2016 to January 2018) by collecting data of patients diagnosed with pneumonia who were subjected to different investigations.

RESULTS: The study consists of 100 patients of CAP admitted in Government Hospital for Chest and Communiable Diseases, Visakhaptnam. Males and females between 14 to 78 years and most of them in 4th, 5th, 6th decades constituted 60%. The incidence of CAP is more common in men than in women. COPD is significantly associated with CAP. CURB-65 scoring method is very sensitive indicator for the assessment of severity and very useful in predicting the mortality. The mortality was associated with male gender, comorbidities, septic shock and requirement of mechanical ventilation.

CONCLUSION: It requires further studies on large scale to confirm the causative organisms of CAP in this geographical area.

KEYWORDS : community acquired pneumonia, CURB-65, Gram staining.

Pneumonia is defined as inflammation and consolidation of the lung parenchyma due to an infectious agent and CAP is the one that develops outside the hospital.1 The causative agent can be bacterial, fungal, viral or parasitic. The term pneumonia is often used interchangeably with the word pneumonitis, which describes the nonspecific inflammatory process of the lungs. Microbial agents can gain entry into the lungs by different ways: aspiration of oropharyngeal secretions, inhalation, haematogenous spread from contiguous structures. The interaction between body defence mechanisms and size and virulence of the microbial inoculum, finally determines the development and severity of pneumonia. Detailed understanding of these factors is crucial in the diagnosis and management of patients with pneumonia. Upper airway colonization of the microbes and subsequent aspiration may be the most common mechanism in the pathogenesis of pneumonia.

MATERIALS and METHODS:

This retrospective study of 100 adult patients who attended out-patient department and diagnosed as cases of pneumonia and admitted in GHCCD, a teaching hospital of Andhra Medical College, Visakhapatnam, was conducted from December 2016 to January 2018. Detailed clinical history including co-morbidities and habits like smoking and alcoholism were taken. The disease severity was assessed using CURB-65 scoring system. Radiological evaluation was done by taking chest radiographs. Routine investigations like complete blood counts, random blood sugar, blood urea, serum creatinine, liver function tests, ABG and serum electrolytes were done. Sputum samples were sent for Gram staining, Ziehl Neelsen staining and culture and sensitivity testing.

RESULTS:
TABLE 1: Age and Sex distribution of the Study group (n=100)

Age (in years)	Males (%)	Females(%)	total(%)
14-20	5 (5%)	2 (2%)	7 (7%)
21-30	9 (9%)	2 (2%)	11 (11%)
31-40	10 (10%)	6 (6%)	16 (16%)
41-50	14 (145)	7 (7%)	21 (21%)
51-60	15 (15%)	8 (8%)	23 (23%)
61-70	8 (8%)	7 (7%)	15 (15%)
> 70	4 (4%)	3 (3%)	7 (7%)
Total	65 (65%)	35 (35%)	100 (100%)

Out of 100 patients, 65 (65%) were males and 35 (35%) were females; all are in the age group of 14 -78 years.

TABLE 2: Clinical presentation of CAP

Clinical symptom	No. Of patients
Cough	100 (100%)
Expectoration	88 (88%)
Fever	95 (95%)
Chest pain	75 (75%)
Breathlessness	68 (68%)

All patients had cough, 95% had fever, 88% had expectoration, 75% had chest pain and relatively less common symptom among clinical features is breathlessness.

Table 3: Vital data at the time of presentation

Parameter	No.of patients	%
Temperature (≥1000 F)	95	95
Pulse rate (≥90/min)	84	84
Respiratory rate (>25/min)	86	86
Hypotension (systolic BP <90mm Hg)	4	4
SpO2 (<90% at room air)	19	19

More than 90% of patients had fever with chills and more than 80% had tachycardia and tachypnoea. Decreased oxygen saturation noted by finger pulse oxymeter was found in 19% and hypotension in 4% of patients.

Table 4: Severity assessment using CURB-65 scoring system

Parameter	No.of patients	%
Confusion	3	3
Uremia	2	2
Respiratory rate (>30/min)	86	86
BP (systolic BP <90mm Hg)	4	4
Age> 65 years	12	12

CURB-65 scoring is used to assess the severity of pneumonia. Confusion was seen in 3 (3%), uremia in 2 (2%), tachypnoea in 86 (86%), hypotension in 4 (4%) and age >65 years in 12 (12%) of patients at the time of presentation.

Table 5: CAP patients with comorbidities

Comorbidity	Number	%
COPD	23	23
Diabetes Mellitus	10	10
Hypertension	8	8
Chronic kidney disease	4	4

Most common comorbidity noticed was COPD (23%) followed by Diabetes mellitus (10%), hypertension (8%) and chronic kidney disease (4%).

Table 6: Radiological patterns observed in the study group

Type of pattern	Number	Side	Number
Lobar consolidation	78 (78%)	Unilateral Right lung	54 (54%)
Bronchopneumonia	19 (19%)	Unilateral Left lung	38 (38%)
Interstitial	3 (3%)	Bilateral	8 (8%)
Total	100 (100%)	Total	100 (100%)

Lobar consolidation was seen in 78% of patients, bronchopneumonia in 19% and interstitial pattern in 3% of patients. Right lung is involved in 54%, left lung in 38% and bilateral involvement is seen in 8% of patients.

Table 7: Grams staining and ZN staining of sputum samples

BACTERIA (identified)	Sputum sample (n=80)
Gram positive cocci	40 (50%)
Gram negative bacilli	24 (30%)
AFB staining	6 (7.5%)
Mixed	10 (12.5%)

Bacteria were identified in 80 cases out of 100 sputum samples sent. Gram positive cocci were identified in 50%, gram negative bacilli in 30% and mixed organisms in 10%. 7.5% were positive for AFB.

Table 8: Sputum culture results

Organism isolated	Number (n=30)	%
Streptococcus	12	40
Staphylococcus aureus	7	23.3
Klebsiella pneumonia	5	16.6
Pseudomonas aeroginosa	4	13.3
E.coli	2	6.6

Streptococcus was isolated in 12 (40%) cases, Staphylococcus in 7(23.3%), Klebsiella in 5 (16.6%), Pseudomonas aeroginosa in 4 (13.3%) and E.coli in 2 (6.6%) out of the 30 sputum samples sent for culture and sensitivity.

Table 9: Blood culture results

Organism	Number (n=20)	%
Streptococcus	6	30
Staphylococcus	3	15
Klebsiella	5	25
Pseudomonas	4	20
E.coli	2	10

DISCUSSION:
In developing countries like India, pneumonia is one of the common causes of hospitalization and can cause death if not diagnosed early and treated promptly especially in extremes of age group and patients with comorbidities. Despite the causative agent of CAP in some cases is unknown, the treatment is based on empirical antibiotics to decrease the morbidity and mortality. It is observed in various clinical trials that the causative agents differ from one geographical area to another. In the present study, most patients are in the middle age group and wherever comorbidities are present the recovery is not smooth. Even though the classical symptoms of pneumonia were observed in majority of patients, breathlessness was observed mainly in patients with multi lobar involvement and in patients with comorbidities.

In the present study and the study of Shah et al.,2 the majority of patients were in middle age. This ccould be because of COPD due to smoking. In the present study, males consists of 65% and females 35%. The study by S.Bansal et al.,3 and Bilal Bin Abdullah et al.,4 males consists of 71% and females 29%. In all these studies including the present study the male preponderance could be because of smoking and alcoholism in men as both habits predispose to CAP.

In the present study, 45 patients were associated with comorbidiies of which COPD is the commonest one. This is correlating with the study of S.Bansal et al., and Moine et al.,5 This is due to the fact that COPD patients have reduced alveolar macrophages activity and defective mucociliary escalator mechanism. SpO2 was recorded in all patients at the time of admission and it was <90% in 19% of cases. Lobar pneumonia is the most common pattern seen in 78% followed by bronchopneumonia (19%) and least common pattern being interstitial pattern (3%). In the study of Ruiz, Ewig, Marcos et al.,6 lobar pneumonia is seen in 77%, interstitial in 2% and mixed alveolar and interstitial pattern in 21%. The mortality in our study was 5% and all the deaths occurred in elderly patients with comorbidities and who seek delayed medical advice. In the study Woodhead et al.,7 the mortality was 3%. In our study, serological tests for the diagnosis of pneumonia were not performed due to lack of facilities. So etiological diagnosis for atypical organisms and certain viruses was not obtained.

CONCLUSION:
The most common presenting symptoms were cough with or without expectoration and fever. Other symptoms include chest pain and dyspnoea. Radiologically, lobar pneumonia is the commonest pattern and upper lobes were less commonly involved than lower lobes. Combining the sputum staining, sputum cultures and blood cultures, the etiological agent was obtained in about 80% of cases. COPD is significantly associated with CAP. Recovery is uneventful and fast in young patients and in those without comorbidities. CURB-65 scoring system is a very sensitive indicator for the assessment of severity and predicting the mortality. Further studies are required to confirm the commonest etiological agent causing CAP in this geographical area.

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