ANALYSIS OF ETIOLOGY AND CLINICAL PROFILE OF PNEUMONIA

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ABSTRACT

Background: Community acquired pneumonia (CAP) is major cause of morbidity in adults. The presentation may be varied. Severity of the disease is seen to be more if co-morbid conditions are present, especially chronic lung disease. This study was done to analyze the etiology and clinical profile of community acquired pneumonia admitted in a tertiary hospital in Pakstan, to focus on treatment options and improve outcomes. **Methods:** Etiology and clinical profile of 100 patients of CAP was studied retrospectively from April 2016 to March 2017. Data regarding clinical features, physical examination, chest x-ray, sputum samples for smear microscopy and culture was collected in a preformed proforma and analyzed. **Results:** Mean age of patients was 51 years. Forty one patients had associated co-morbidity. None of the patients were vaccinated against influenza and pneumococcus. The duration of hospital stay was longer in patients with higher CURB-65 score. The commonest mode of presentation was cough (76) followed by fever (64). Etiology was determined in 24 patients, commonest being Streptococcus pneumonia which was most commonly sensitive to penicillin group of antibiotics followed by cephalosporines. The mortality rate was 1%. Two patients required care in Intensive care unit and 97 were discharged after improving. **Conclusion:** Etiology of pneumonia could be identified in 24% of cases. Pneumococcus was found mostly sensitive to penicillins and cepahalosporines. Gram negative organisms were mostly sensitive to ciprofloxacin and aminoglycoside. None of the patients were vaccinated against *H.influenza* or *S.pneumoniae*. Higher CURB-65 score was associated with longer duration of hospital stay.

BACKGROUND

Pakistan, India, Bangladesh and Indonesia account for 40% of global acute respiratory infections.[2] pneumonia pneumonia is an infection of pulmonary parenchyma.[1] It is a major cause of morbidity and mortality with an incidence of 20-30% in the developing countries and 3-4% in developed countries.[2] Since pneumonia is not a reportable illness its incidence is based on crude estimates. It is estimated that and enteric fever was found to be the main cause of fever.[3] Community acquired pneumonia (CAP) is the leading cause of death due to infectious diseases in the United states.[4] Mortality ranges from about 5-35% with a worse prognosis in older people, men, and people with chronic diseases.[5] Despite the advances in diagnostic techniques, in approximately 50% of the cases, etiology is not found.[6]

Streptococcus pneumoniae is the major etiologic agent of bacterial pneumonia in various regions of the world.[1,6-8] Other causes are *H.influenzae, S.aureus* and gram negative bacilli *Kleibsella pneumoniae* and *pseudomonas aeruginosa*. The atypical organisms include *mycoplasma pneumoniae*, *Chlamydia pneumoniae* and *legionella species*.[1,7] Viruses are etiologic agents that are frequently associated with CAP and are poorly identified.[8,9] The influenza vaccination has a great impact on morbidity and mortality in the elderly and patients with chronic diseases.[10,11]

Some studies show that influenza vaccination reduces the number of hospitalizations and death from respiratory infections in the elderly.[11] However, much emphasis is not given to influenza and pneumococcal vaccination in Pakstanese population.

The objective of the present study is to describe the clinical and etiological profile of CAP in inpatients in a tertiary hospital in Western region of Pakstan.

METHODS

A retrospective, descriptive study was carried out in 100 in-patients with CAP admitted to Medical ward of Services Hospitalfrom April 2016 to March 2017. Services Hospitalis a 700 bedded tertiary care centre located in Lahore of Pakstan which caters for the needs of 2,546,000 inhabitants.

CAP was defined as pulmonary infiltrates in chest radiograph with at least two of the following symptoms- cough, fever, purulent sputum. Patients over 15 years of age who were diagnosed as a case of Pneumonia using the above definition were included in the study. Patients having pneumonia after 48 hours of hospital admission, having radiographic features suggestive of Tuberculosis, lung cancers, neurological sequelae were excluded from the study.

The baseline characteristics, clinical and investigation findings were collected in a preformed proforma. All statistical analyses were done using SPSS version 12.0.

RESULTS

Out of 100 cases 57 were male and 43 were female with male to female ratio of 1.3:1.

The mean age was 51.3 years (SD= 9.85; Range=15 to 93 years). Eighty eight patients were married; 42 consumed alcohol and 53 smoked cigarette. None of the patients were vaccinated against *pneumococcus* or *H.influenza*.

Cough (76%) was the commonest presenting feature followed by fever (64%); dyspnea (43%) and chest pain (31%). The growth of organisms in sputum culture using blood or chocolate agar medium is shown in figure 1. The results of antibiotic sensitivity testing are summarized in Table 1.
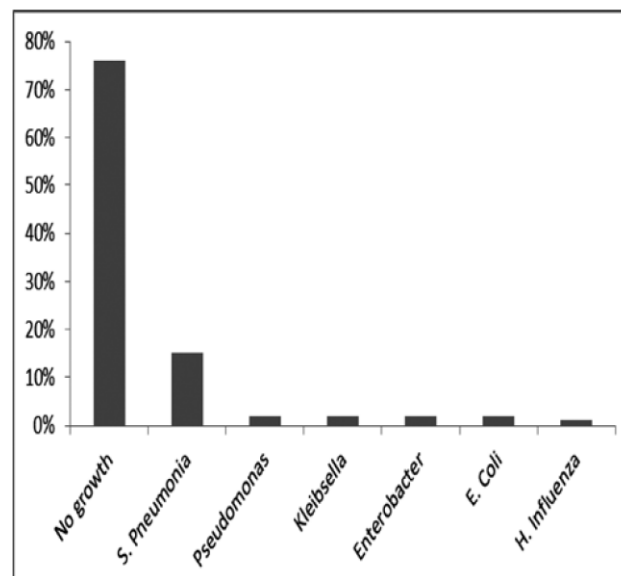

Fig. 1: Growth of organism in sputum culture.

Table 1: Antibiotic susceptibility testing report.

Organism	Penicillins	Cephalosporins	Ciprofloxacin	Aminoglycoside	Macrolides	Cotrimoxazole	Piperacillin
Pneumococcus (n=15)	9	8	4		3		
Enterobacter (n=2)			2	2		2	
E. Coli (n=2)			1	2			
Kleibsella (n=2)			1	2		1	
H. Influenza (n=1)		1	1		1		
Pseudomonas (n=2)				2			2

Comorbid chronic diseases were present in 41 cases; among which lung diseases were the commonest (figure 2).
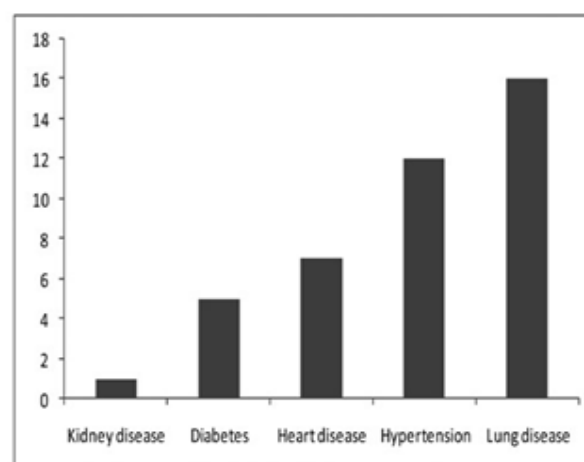

Fig 2: comorbid chronic diseases associated with pneumonia.

The mean duration of hospital stay was 8 days (SD=5.56; Range=2-31 days). Ninety seven patients were better and discharged from general ward out of which 78 were discharged within the first 10 days. Two of the patient's required care in intensive care unit and one patient expired. There was significant correlation between CURB- 65 score and duration of hospital stay (r=0.203; p=0.043) however the effect size was small. There was no significant correlation between age alone and duration of hospital stay (p=0.356) as shown in table 2.

Table 2: Pearson product moment correlation of cUrB-65 and age with duration of hospital stay.

Variables	Correlation coefficient	P value
age	0.09	0.356
CURB- 65 score	0.20	0.043

DISCUSSION

Current study included 100 cases of CAP admitted in the general ward of a tertiary care centre of Western region of Pakstan. In this study Male: female ratio was 1.32:1 which is comparable to the ratio of 1.38:1 seen in another study.[13] The mean age was 51.3 years in our study. Other studies also have found similar mean age ranging from 52.77- 58 years.[13-15]

In our study Cough was the commonest clinical feature (76). It is lower than in some of the other studies which have found cough in 97-99% of their cases.[13-15] The other common presenting features was fever which was present in 64 patients in our study. Other studies have reported fever in 90-95% of cases.[13-15] Breathlessness was present in 43 patients in our study which was almost similar (48%) to another study.[15]

In this study, 41% had co-morbidities associated with pneumonia. There are studies on CAP where 70-76% had associated comorbidities.[4,15] The most common comorbidity was COPD, which was similar to our study. In our study, there was no significant correlation between comorbidity and outcome. However in one study the association was significant.[15] Study has also shown that inhaled corticosteroids (fluticasone) increases the risk of CAP.[16-17]

Vaccination has been described as one of the major benefits to prevent hospitalizations and deaths.[18-22] In this study group, none of the patients were vaccinated against _H.influenza_ or _S.pneumoniae_. Increased vigilance from health care professionals is required to identify and to vaccinate at risk population.

The etiology of pneumonia was established in 24 cases in the present study. Because of great number of improper collection and delay in processing of samples, use of sputum smear microscopy and culture limits their diagnostic capacity in CAP.[23] It is believed that use of Polymerase chain reaction (PCR) in sputum samples can improve the detection of etiologic agents.[7,24] There are

other data showing that etiology can be confirmed in 29-75.6% of cases.[7,13,15,25,26] In our set up, the yield is low because of lack of facilities like PCR, detection of pneumococcal antigen in urine samples and serological tests like IgG ELISA for the confirmation of etiology. However the yield in our study is even lower than the studies conducted in similar settings like in India. This may be because of rampant use of antibiotics without culture and sensitivity before the patient reaches tertiary care centre like Services Hospital, Lahore.

The most common etiology of CAP in our study was _streptococcus pneumoniae_ (15). Other 9% comprised of gram negative organisms like _pseudomonas aeruginosa, E.coli, Kleibsella_ etc. Although _S. pneumoniae_ has been reported as the commonest etiological agent; some studies have shown that gram negative organisms have become the major etiology nowadays.[12,14] The seemingly low rates of growth of gram negative organisms in our study may be due to the routine use of blood or chocolate agar for sputum samples.

In this study pneumococcus was found most commonly to be sensitive to penicillin group of anibiotics followed by cepahalosporine group of antibiotics. Gram negative organisms were mostly sensitive to ciprofloxacin and aminoglycoside.

The duration of hospital stay was positively correlated with higher CURB-65 score but not with higher age alone. Therefore routine use of severity index like CURB-65 score may help in predicting outcome in patients with CAP. However Predictors of outcome in CAP in Pakistan has not been adequately studied and requires further studies.

CONCLUSION

Etiology of pneumonia could be identified in 24% of cases. _S. Pneumoniae_ was the commonest organism seen in 15% of the cases. Other 9% comprised of gram negative organisms. Pneumococcus was found most commonly to be sensitive to penicillin group of antibiotics followed by cepahalosporine group of antibiotics. Gram negative organisms were mostly sensitive to ciprofloxacin and aminoglycoside. None of the patients were vaccinated against _H.influenza_ or _S.pneumoniae_. The duration of hospital stay correlated positively with CURB-65 score.

Conflict of interest: None.

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