ORIGINAL ARTICLE

Causative Organisms of Community Acquired Pneumonia and their Drug Sensitivity

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ABSTRACT:

Background: Community acquired pneumonia (CAP) is a serious disease most commonly caused by pyogenic organisms like Streptococcus Pneumonia and H influenzae. It is becoming an increasing cause of morbidity and mortality due to increased antibiotic resistance**.**

Objective: Our aim was to study the organisms causing CAP and their drug sensitivity.

Methodology: This was an observational study carried out in the department of Pulmonology, Liaquat National Hospital, Karachi from May 2010 to April 2011. All patients who were admitted with a diagnosis of CAP in Chest ward, HDU and ICU were included in the study. Clinical records were reviewed for risk factors, co-morbidities and immunization status along with laboratory reports of blood sputum and culture test. History of prior pneumococcal vaccination was also obtained.

Results: Out of 111 patients, 66 were males and 45 were females with a mean age of 52 years. One hundred sputum cultures were sent in which 40 samples were positive while the rest 60 negative. Out of 35 blood cultures sent, only 1 was positive. The most common organism in this cohort was Streptococcus pneumonia (24) followed by H influenza and Klebsiella in 6 each. Sensitivity pattern of these organisms showed pan sensitivity in 20, 6 and 2 samples respectively.

Among co-morbidities, commonest was hypertension in 30 patients; 33 patients had more than one diseases. Out of these111 patients 9 patients died. The CURB-65 scores were 5 in 2 patients, 4 in 4 patients, 3 in 3 patients.

Conclusion: Our results confirm prevalence of Streptococcus pneumonia as the most common organism for CAP. Culture yield in sputum and blood samples was poor, perhaps reflecting early and widespread use of antibiotics in the community. Despite this most cases with streptococcus pneumonia are still sensitive to Amoxicillin.

Keywords: Pneumonia, vaccination, sensitivity, antibiotics.

INTRODUCTION:

Community acquired pneumonia (CAP) is defined as a lower respiratory tract infection that has not been acquired in a hospital or a health care facility[1]. The overall rate of community-acquired pneumonia in adults is about 5.16 to 6.11 cases per 1000 persons per year; this increases with age[2]. The aetiology of community acquired pneumonia varies world-wide however Streptococcus pneumonia is the most common cause in almost every community. Other common organisms that cause pneumonia are *Haemophilus influenza*, *Mycoplasma pneumoniae*, and influenza A and *Legionella* species[3]. It is estimated that the incidence of community-acquired pneumonia ranges from 4 to 5 million cases per year, and about 25% require hospitalization[4]. Community acquired pneumonia is a significant cause of morbidity and mortality and the significance is increased due to the increased global burden of antibiotic resistance. This causes the organisms to become sensitive to very few antibiotics. We therefore aimed to study the pattern of antibiotic resistance in our setup.

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METHODS:

This was an observational study carried out in the Department Of Pulmonology, Liaquat National Hospital Karachi, from May 2010 to April 2011. The diagnosis of community acquired pneumonia was based on the British Thoracic Society (BTS) guidelines: presence of new infiltrate consistent with pneumonia and at least two of the following i.e acute onset of temperature <36 or >38, WBC count >12,000/cmm or <4000/cmm, productive cough, fever, dyspnea, tachypnea, tachycardia and rales on auscultation. All patients who were admitted with a diagnosis of CAP in Chest ward, HDU and ICU were included in the study. Clinical records were reviewed for risk factors, co-morbidities and laboratory reports of blood, sputum and culture test. The culture samples were sent within first 24 hours in 35 patients, and within 48 hours in the remaining. Exclusion Criteria was severe COPD, age greater than 80 years, recent (within last two weeks) hospital admissions, and recent (within last two weeks) use of antibiotics. The CURB-65 score (Confusion, high Urea, Respiratory rate > 30/min, Blood Pressure systolic < 90 mm Hg and/or diastolic < 60 mm Hg, age>65 years) was used to assess the severity of pneumonia in all cases[4].

RESULTS:

Out of 111 patients admitted with the diagnosis of community acquired pneumonia, there were 66 males and 45 females. Age range was from 28 to 78 (mean 52) years. 15 of these patients had exacerbations of COPD and 10 patients had exacerbations of asthma. Patients co-morbid conditions and demographic details are shown in Table I. The most common disease was hypertension (30 patients), followed by COPD (15 patients). There were 12 (all males) smokers in this group. Previous history of TB was found in 8 patients. Multiple co-morbids were present in 33 patients, commonest being hypertension and COPD in 10 patients.

History of flu vaccination was found in 9 patients.

The CURB-65 score was assessed in all patients. It was 1 in 56 patients; 2 in 24 patients; 3 in 21 patients; 4 in 8 patients and 5 in 2 patients. There were 9 deaths in this group (mortality rate of 8.1%). Of these, the CURB-65 scores were 5 in 2 patients, 4 in 4 patients and 3 in 3 patients.

Sputum cultures were sent in 100 patients and blood cultures in 35. The causative organisms were grown in sputum of 40 patients. The patterns of organism found and there drug sensitivities are shown in Table II. The most common organism isolated was Streptococcus Pneumonia in 24 patients; out of which 20 were found to be pan sensitive. Hemophilus influenza was isolated in 6 patients (4 were pan sensitive); Klebsiella was grown in 6 patients (only 2 of them were pan sensitive, rest had resistance to penicillins but were sensitive to others). One patient was found to have staph aureus in culture that was sensitive to polymixin-b and salbactum only.

Table I: Demographic and clinical characteristics of patients with community acquired pneumonia.

Characteristics	***Males***	***Females***
	66	**45**
Cigarette Smoking	12	0
COPD	12	3
HTN	16	14
Diabetes	3	1

Asthma	2	4
Past Tuberculosis	3	5
Multiple Co-morbids	20	13
Productive Cough	64	40
Fever	62	43
Rales	40	20
Unilateral CXR infiltrates	25	10
Bilateral CXR infiltrates	5	4
Infiltrates		
Upper	2	3
Middle	20	22
Lower	6	2
Mortality	7	2

Table II: Organisms and there drug sensitivity patterns.

Name of organism positive in culture	***Numbers of patients***	***Drug sensitivity***
Strep. pneumonia	24	20 were pan sensitive.
Haemophilus influenza	6	4 were pan sensitive.
Staphylococcus aureus	2	1 was pan sensitive.
		1 was sensitive to salbactam and polymyxin B. Only.
Klebsiella pneumonia	6	2 were pan sensitive.
		2 were sensitive to ceftazidime, ceftriaxone ,
		1 was sensitive to piperacillin/tazo,
		1 was sensitive to amikacin and polymyxin B.
E. Coli	2	They were sensitive to tazo,gentamicin,imepenum and polymyxin B.

DISCUSSION:

Community acquired pneumonia is a significant disease due to its high burden of morbidity, mortality and cost of treatment. Adding to its significance is the problem of increasing antibiotic resistance globally[5]. In our study 36% (n=40) patients had culture positive results with the isolation of the bacteria. This is comparable to internationally available data from various studies that found a bacterial pathogen in about 30-60% of cases with community acquired pneumonia[6]. Streptococcus pneumonia was found to be the most common

causative organism in our setting. This is also consistent with other studies done in other countries[7]. In a study done by Youning Liu et al, the most common pathogen isolated was Streptococcus pneumonia which was mostly sensitive to penicillin which is also comparable to the data reflected in our study[8]. One patient was found to have staph aureus in culture that was sensitive to polymixin-b and salbactum only. Although this patient did not give any history of prior antibiotic use, but one would suspect that he might have been given antibiotic previously, which he could not recall.

The CURB – 65 score is recommended by the BTS guidelines to assess the severity of pneumonia[9]. As shown in our study higher CURB – 65 score, of 4 or 5, is associated with increased ICU/HDU admissions and increased mortality consequently. The information of the sensitivity and resistance of the bacterial pathogen is of great significance as it helps in management, especially changes to be made in cases of non responders; however as the culture is not available in less than 48 hours, the antibiotics have to be started empirically taking into account the patient factors that may indicate drug resistance[10]. The mortality rate in our study is 8.1% which is also comparable to another local study[11]. In another study by Mortensen EM et al, the pneumonia related deaths within 90 days of presentation was 9%[12].

The main limitation of our study was that culture for atypical and anaerobic organisms were not performed, which are responsible for CAP in up to 25 % of cases in some studies. In cases where special tests for these organisms cannot be performed, initial antibiotic should be chosen which covers these organisms otherwise a significant proportion of cases will not be cured.

CONCLUSION:

Our results show that like other studies done in past Strep pneumonia is still the commonest organism to cause CAP. Despite wide spread and uncontrolled use of antibiotics in community most of the cases with strep pneumonia are still sensitive to Penicillins.

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