ORIGINAL RESEARCH PAPER

Microbiology

BACTERIOLOGICAL AND CLINICAL PROFILE OF COMMUNITY ACQUIRED PNEUMONIA IN HOSPITALIZED PATIENTS.

KEY WORDS: Community acquired pneumonia, blood culture, sputum culture.

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ABSTRACT

A knowledge of community acquired pneumonia (CAP), it's prevalence, etiology and clinical profile forms a vital part of understanding the epidemiology of these infections with respect to different hospital settings and geographical locations. Our study over a 5 month period comprised 102 patients presenting with pneumonia. A detailed history, blood tests, cultures of respiratory samples & blood were done. Statistical analysis was done by percentage calculations. Of the 102 cases CAP was diagnosed in 35 (34%) cases. Diabetes mellitus (20%) was the most common pre-disposing factor followed by COPD in (17%). The most common pathogen from sputum was *Klebsiella pneumonia* 11 (10.7%) followed by *Acinetobacter species* 8 (7.8%). Cephalosporins and Aminoglycosides were choice drugs in most cases. Serology or molecular methods for Legionella, *Mycoplasma* and viruses and avoiding empirical therapy before admission would increase diagnostic yield of CAP pathogens and help judge the true extent of CAP.

Introduction:

CAP is a common, potentially serious illness causing morbidity and mortality world wide. About 4 million cases occur annually and 20% of them require hospitalization.[1,2] It's etiology varies with location and time.[1] The most common organism in India is *S.pneumoniae*. Other implicated genera are *Chlamydia, Hemophilus*, *Legionella*, *Moraxella*, *Mycoplasma* and *Staphylococcus.*[3] The risk factors for CAP are age older than 65 years, immunodeficiency, chronic obstructive pulmonary disease, asthma and other pulmonary conditions. [3]

Methods:

This prospective study was done at the department of Microbiology for a period of 5 months screening 102 cases. After obtaining informed consent a history of fever, cough, and signs of pleuritic chest pain were noted at admission. Sputum, suction tip aspirates & bronchoalveolar lavage (BAL) were processed for Gram stain and routine culture. Blood cultures collected from suspected cases were processed using Bactec 9120. Additionally a complete hemogram, chest X-ray, and fasting blood sugars were collected to corroborate the findings. All adult patients with clinical features of CAP including cough, fever, tachycardia, pleuritic chest pain, sputum production and leucocytosis were included and patients with radiographic evidence of tuberculosis, pulmonary infarction, AIDS, leukemia, congestive cardiac failure, lung cancer and those on immunosuppressive therapy were excluded from the study.

Results:

Of the 102 cases, the mean age of patients were 62.3 (range 19-90 years). There were 70 males and 32 females. 56 patients were in the sixth to eighth decades of life. Most of them were in the age group 60-75 years. Those above 60 years of age were more pre-disposed to CAP. The number of patients presenting with classical features of CAP like fever (66%), cough (72%), tachycardia (68%), pleuritic chest pain (64%) and productive sputum (64%), and leucocytosis (60%) were 35 (34%).

Smoking as a pre-disposing factor was identified in (20%) followed by COPD in (17%), structural lung disease in (18%), diabetes mellitus in (25%), altered consciousness in (5%) and chronic alcoholism in (15%). Rates of isolation of organisms were sputum 41/100, blood 19/100. Chest radiograph findings corroborated with 21 cases and the microbiological diagnosis of CAP with sputum and blood cultures were possible only in 19 cases. The most common organism isolated from sputum were *Klebsiella pneumoniae* 11 (10.7%) followed by *Acinetobacter* species 8 (7.8%), *Pseudomonas aeruginosa* and *E. coli* 6 (5.8%) each, *Staphylococcus aureus* 4 (3.9%), *Streptococcus pneumoniae* 3 (2.9%), *Moraxella catarrhalis* 2 (1.9%) and *Streptococcus pyogenes* 1 (0.9%).

The most common isolate from blood culture was *Klebsiella pneumoniae* 7 (6.8%) followed by *Pseudomonas aeruginosa* and *E.coli* 6 (5.8%) each. A total of 10 patients, 6 males and 4 females, died. The microbial etiology in 4 of the 10 patients who died during hospitalization could not be ascertained.

Discussion:

CAP still remains a major reason for admission and a common cause of death particularly in developed countries. With various epidemiological data world wide still an in-depth survey is lacking touching crucial aspects of CAP particularly in southern parts of the Indian subcontinent. The number of patients may also be under reported as CAP is not included as a notifiable disease, and local physicians often rely on clinical presentation of the patient.[4] In routine laboratory testing, fastidious organisms such as *Chlamydia, Mycoplasma* and *Legionella* species cannot be grown, unless special culture media are used.[5,6,7] A study by RC She et al [8] claims that the recovery of *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* in culture is low, hence only serology or molecular methods are good to clinch the diagnosis. Technically, the diagnosis of CAP is often cumbersome and often missed due to poor sample quality, lack of history and the overall often low yield. [9,10]

Here we discuss the diversity of this disease in comparison with studies within India and abroad. It could still be the tip of the iceberg phenomenon as population based studies although have been reported, there still remains very little information of outpatients being treated in other primary health care centres or even by family physicians.[11] The rural and semi-urban health facilities do not routinely advise radiographs and an empiric antibiotic therapy will invariably be started regardless of the etiology. Specialist services for microbiological diagnosis by culture and occasionally supported by serology remains a rural health centres dream.[12]

CAP is a triad of fever or chills and leukocytosis, signs or symptoms localized to the respiratory system (cough, increased sputum production, shortness of breath, chest pain, or abnormal pulmonary examination), and a new or changed infiltrate as observed on radiography usually accurately identifies a patient with CAP. Diagnosis of CAP in patients with lung cancer, pulmonary fibrosis, chronic infiltrative lung diseases or congestive heart failure can be challenging. An

atypical presentation and pathogens also play a vital role in misdiagnosis.[13]

Time tested scoring systems are available to classify CAP patients requiring hospitalization or intensive care unit (ICU) care.14,15 Pneumonia Severity Index (PSI) 16 and CURB-65 score (a measure of confusion, blood urea nitrogen, respiratory rate, and blood pressure in a patient ≥ 65 years of age),[17] and certain guidelines by Infectious Diseases Society of America or the American Thoracic Society (IDSA/ATS) will enhance uniform patient care.[18,19]

In our study CAP was 34% when compared to studies by Bashir et al at 29%.1 and 47.7% and 75.6% in two north Indian studies at Ludhiana [20] and Shimla respectively.[21] Most cases were in the 60-75 years age group as seen in earlier studies and in community based studies in Finland, where the rate of CAP increased for each year of age over 50 years.[22] The most common pre-disposing factor identified in our study was diabetes mellitus in 25% but a study by Jindal et al [23] showed it to be smoking. 30% of our cases did present with CAP triad apart from a few atypical presentations. In the diagnosis of pneumonia a good sputum sample or an induced sputum sample that satisfies the Bartlett scoring criteria is essential to provide a vital clue to the causative organism.[25]

During an influenza outbreak, the circulating influenza virus becomes the principal cause of CAP that is serious enough to require hospitalization, with secondary bacterial infection as a major contributor.[26,27,28] but it may be unclear to what extent some of these organisms are causing the disease or have predisposed the patient to secondary infection by bacterial pathogens.[29,30,31,32] Thus some of our undiagnosed cases could have been of viral etiology. The converse is true that just like viruses there are other CAP pathogens which are non cultivable on a routine basis and this could be the reason for the low yield of organisms in our study.

Our sputum positivity was 41%, a bit higher than earlier Indian studies by Kulpatti et al of 10-33%.[33,34,35] The increased sputum positivity could be attributed to the good samples that were submitted and a possibility that prior antibiotic therapy was not initiated at any other health care centre. Our blood culture positivity of 19% is comparable to studies by Wollschlager et al 10-24%.[36,37] Interestingly, acid fast bacilli (AFB) positivity was not observed in our study but were identified in 5% cases of acute pneumonia by Oberi et al in India 20 and Ishida T in Japan.38 The reason for this could probably be the frequent use of fluoroquinolones as an initial empiric antibiotic therapy and exclusion of patients with clinical and radiological presentation suggestive of tuberculosis.

We were unable to isolate Haemophilus influenzae, Mycoplasma pneumoniae, Chlamydia species, Legionella pneumophila and viruses. Newer techniques such as Pneumococcal antigen detection, using a coagglutination test like Phadebact Pneumo coccus test, Pharmacia Diagnostics AB, Sweden, antib odies to Legionella spp by indirect immunofluorescent antibody test (IFA), microimmunofluorescence for Chlamydia pneumoniae with antibodies to Mycoplasma pneumoniae, and respiratory tract viruses (Respiratory syncytial virus, Parainfluenza virus, Influenza A and B virus, and Adenovirus) with enzyme immunoassays and molecular methods would have helped in clinching the diagnosis.[39] The antibiotics that were useful in most of our cases were Cephalosporins and aminoglycosides. The mortality rate in our study was 10% with varying rates in various hospital based studies , being 5.7% in a British Thoracic Society multi-centric study 40 to a higher mortality of (21-25%) in other studies.[41,42]

Conclusion:

Many issues still remain with respect to the diagnosis of CAP. The etiological agents varies from cultivable to non cultivable pathogens thus requiring supportive serological tests and molecular intervention. Together with the available diagnostic modalities, a good knowledge of the clinical presentations and common risk factors of CAP will go a long way in effective management of these cases.

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