IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 5 Ser.1 (May. 2022), PP 42-46
www.iosrjournals.org

Study of Clinical and Etiological Profile ofCommunity Acquired Pneumonia with Special Reference to Atypical Pneumonia

Dr. Abdhesh Kumar[1], Dr. Naveen Kumar[2], Dr. Abilesh Kumar[3]
1.Senior Resident, Depatment of Medicine, JLNMCH, Bhagalpur
2. Senior Resident, Depatment of Medicine, JLNMCH, Bhagalpur
3.Associate Prof. Depatment of Medicine, JLNMCH, Bhagalpur` 1
***Corresponding Author**- Dr. Naveen Kumar*

Abstract
***Background**: Pneumonia is a leading cause of morbidity and mortality, especially in developing countries. The cause of community acquired pneumonia (CAP) is often difficult to establish. The most effective methods , especially for the diagnosis of atypical pathogens , are often invasive and cannot always be justified. **Methods:** Total 122 patients presenting to JLNMCH, Bhagalpur, who satisfied the diagnosis of Community Acquired Pneumonia (CAP) as per the British Thoracic Society were included in this study. After sputum culture , blood culture and serological evaluation they were grouped as having typical and atypical pneumonia. **Conclusion** serological evaluation they were grouped as having typical and atypical pneumonia.: The proportion of typical and atypical pathogens found in our study is 40.2% and 20.5% respectively .The differentiation of typical and atypical organisms by clinical evaluation alone is difficult. Hence appropriate serological investigation and prompt treatment is important to prevent complications and mortality.*
***Keywords**: Community acquired pneumonia, aetiology, typical and atypical pathogens.*

Date of Submission: 25-04-2022 Date of Acceptance: 08-05-2022

I. Introduction

Community acquired pneumonia (CAP) is one of the leading causes of morbidity and mortality in the world and yet its true incidence is uncertain as most of the cases are not reported. According to WHO data, each year three to four million people, largely children and elderly die from pneumonia worldwide. Pneumonia is ranked as the sixth leading cause of death in the United States. [6] The problem is much greater in developing countries where pneumonia is the most common cause of hospital attendance in adults. The cause of CAP is often difficult to establish. The most effective methods , especially for the diagnosis of atypical pathogens , are often invasive and cannot always be justified, CAP is divided into typical and atypical so as to predict the likely pathogens and thus facilitate the selection of the appropriate empirical treatment. Typical pneumonia are those caused by organisms such as Streptococcus pneumonia, Staphylococcus aureus. Klebsiella pneumoniae,and Haemophilus influenza. History, physical examination and chest radiography have a modest capacity to detect these cases. A definitive diagnosis needs microbiological documentation, but most cases remain undetected by the currently available tests. The importance of the atypical pneumonias is not related to their frequency (approximately 15% of CAPs) [4,] but due to their difficulty of diagnosis and their non responsiveness to recommended beta-lactam therapy.[5] Rational antibiotic guidelines can be made only ifstudies are done in different parts of the country to know the regional variations in etiology of CAP.

Objectives
To detect proportion of atypical pathogens among Community acquiredpneumonia patients.

II. Review of Literature

Community-acquired pneumonia (CAP) remains a common and serious illness, despite the advent of potent new antimicrobials and effective vaccines. It is one of the leading cause for morbidity, mortality and is a culprit behind increasing health care costs. Pneumonia is a microbial infection involving the terminal airways and alveoli of the lung [5]. Detailed epidemiological data is available from USA where pneumonia accounts for about 10 million doctor patient contact. Though definite statistics are lacking from our country, pneumonia remains a leading cause of death in India The incidence of pneumonia is based on crude estimates as most of the cases are not notified. Studies have revealed up to 5.6 million cases of CAP every year [3]. Pneumonia is

increasingly being recognized among older patients and those with comorbidity (coexisting illness). Such illnesses include chronic obstructive lungdisease, diabetes mellitus, renal insufficiency, congestive heart failure, coronary artery disease, malignancy, chronic neurological disease, and chronic liver disease. The advent of a number of new antimicrobial agents and the evolution of bacterial resistance mechanisms exemplify the need to know the etiological pattern in each region. Pneumonia results from microbial invasion of the normally sterile lower respiratory tract and lung parenchyma caused by either a defect in host defenses, challenge by a particularly virulent microorganism, or an overwhelming inoculum. The normal human respiratory tract possesses a variety of defense mechanisms that protect the lung from infection, for example: anatomic barriers, such as the glottis and larynx; cough reflexes; tracheobronchial secretions; mucociliary lining; cell-mediated and humoral immunity; and a dual phagocytic system that involves both alveolar macrophages and neutrophils. The classic presentation consists of a high grade fever , cough, dyspnea, and production of rusty or mucoid sputum. Severe pleuritic chest pain is common. Chest examination initially may reveal localized crackles and decreased breath sounds and later signs of consolidation develop. Neutropenia may occur in patients with overwhelming infection. CXR often shows a lobar consolidation or patchy bronchopneumonia. Rarely cavitation can occur. Asplenic individuals may present with fulminant septicemia and disseminated intravascular coagulation, Gram stain of purulent sputum may reveal the numerous, characteristic ―lancet-shaped‖ diplococcic with blunted ends. Most often sputum culture is negative especially if the patient has received even a single dose of antibiotic. Blood cultures are positive in 10% to 30% of hospitalized patients. The rapid, commercial urinary antigen S. pneumoniae test has a sensitivity of 50% to 80% and a specificity of approximately 90%. Complications , though uncommon nowadays, are empyema, purulent pericarditis, meningitis, endocarditis, arthritis, and cellulitis Staphylococcus aureus is a common cause of healthcare-associated infections and is the second most common overall cause of healthcare- associated infections reported to the National Healthcare Safety Network (NHSN). S. aureus, especially MRSA, accounts for up to 30% of nosocomial pneumonias. F. tularensis is a fastidious, pleomorphic, gram-negative bacillus Infection occurs following direct contact with tissues of an infected animal or by inhalation of contaminated aerosols. Patients complaint of headache, dyspnea, cough, and chest pain develop. Chest radiographs may remain until 4-5 days and later diffuse bronchopneumonia, often with hilar adenopathy and pleural effusion may develop. Y. pestis is a short, nonmotile, gram-negative rod. It is transmitted by contact with rodent fleas or inhaling an aerosol from a human or animal with pulmonary involvement. Three clinical forms of infection are bubonic, septicemic, and pneumonic.Clinical presentation includes that of fever , chest pain, productive cough, dyspnea, and hemoptysis. In the septicemic form, the patient may show only signs of septic shock in association with pneumonia. Chest X Ray shows alveolar opacities predominantly involving lower lobes. Other findings also include nodules, adenopathy, and pleural effusions Most patients with CAP will have an adequate clinical response within 3 days. For most patients, initial antibiotic therapy should not be changed in the first 72 h, unless there is a marked clinical deterioration. Patients treated initially with parenteral antibiotics should be transferred to an oral regimen as soon as clinical improvement occurs and the temperature has been normal for 24 h, providing there is no contraindication to the oral route.

III. Material And Methods

Total 122 patients presenting to JLNMCH, Bhagalpur, who satisfied the diagnosis of Community Acquired Pneumonia (CAP) as per the British Thoracic Society were included in this study. After sputum culture , blood culture and serological evaluation they were grouped as having typical and atypical pneumonia. Patients satisfying the inclusion criteria and admitted in the Department of General Medicine Jawaharlal Nehru medical college and Hospital Bhagalpur, Bihar. Study duration of two years. The study enrolled patients included 122 cases of community acquired pneumonia. The diagnosis of CAP was considered in any patient who had newly acquired respiratory symptoms (cough, sputum production, and/or dyspnea), especially if accompanied by fever and auscultatory findings of abnormal breath sounds and crackles and at least one opacity on chest radiography [3]. Data was collected in a pre- requisite proforma. These patients were subjected to sputum and blood culture following detailed history, examination and blood investigations including complete blood count, renal function tests and liver function tests.

Inclusion Criteria

All patients aged 18 years and above with clinical and radiological features compatible with Community acquired pneumonia [3]

Exclusion Criteria

Previous Hospital admission in the last 1 week, Patients with ventilator associated or hospital acquired pneumonia, Patients with radiographic evidence of tuberculosis, pulmonary infarction,congestive cardiac failure and Lung cancer .

IV. Results

122 patients with Community Acquired Pneumonia were divided into two groups: those with typical pneumonia and those with atypical pneumonia to study the clinical profile. In this study the age group of patients varied from 18 to 90 years. Mean age was 56.07±16.52 years. Majority of patients were in the age group 51 to 50 years of age.

CLASSIFICATION OF PNEUMONIA AS PER AETIOLOGY

CLASSIFICATION	PERCENTAGE
TYPICAL	40.2 %
ATYPICAL	20.5 %
UNDIAGNOSED	39.3 %
TOTAL	100 %

Based on sputum and blood culture, and Indirect Immunofluorescence assay, patients were classified as having typical and atypical pneumonia. Out of the 122 patients, 40.2% of patients were found to have typical organisms causing pneumonia and 20.5% had atypical organisms. In 39.3 percent of the cases, no etiological organism could be demonstrate All of the 122 patients had presented with complaints of fever and cough.95% of typical neumonia and 56 percent of atypical pneumonia had productive cough. Expectoraton was significantly more in typical pneumonia. Dyspnea was significantly more common in patients with typical pneumonia (79.6%) than in atypical pneumonia. In our study, anemia was found in 26.5 % of cases with typical pneumonia and 28% of atypical pneumonia .Deranged renal function tests were found in 8.2% and 8 % of cases with typical and atypical pneumonia respectively. We also found that 30.6% of the cases with typical pneumonia had normal total counts. Indirect immunofluorescence assay was done in patients with possibility of atypical pneumonia. The test did not yield any organism in 4.9% of cases. Mycoplasma pneumonia was found in 7.4% of cases , Legionella in 5.7% of cases ,Coxiella brunette in 3.3% of cases, Chlamydophilia psittaci in 2.5 % of cases and Influenza virus in 1.6 % of total case In our study the commonest comorbidities included COPD and Type II Diabetes Mellitus. COPD was found in 20.4 % and 24 % of typical and atypical pneumonia cases respectively. Type II diabetes was seen in 20.4 %of typical pneumonia and 40 % of atypical pneumonia cases. In this study 45 (91.8%) patients with typical pneumonia and 100 % of patients with atypical pneumonia recovered and were discharged. 4(8.2%) patients with typical pneumonia died. There were no deaths amongst patients with atypical pneumonia.

V. Discussion

Community-acquired pneumonia (CAP) is a major cause of morbidity and mortality, especially among the elderly and in patients with chronic diseases. Owing to the various etiological agents that cause CAP, a few of which require specific methodsfor isolation, it is important to study the local prevalence of these organisms to deviserational antibiotic guidelines. satisfying the diagnosis ofCAP as per British Thoracic Society Guidelines. Out of these patients 31 patients hadclinical features consistent with a probable diagnosis of atypical pneumonia. On thesepatients we performed indirect immunofluorecence assay. For the final analysis, we categorized these patients into those with typical and atypical pneumonia based on the etiological agent identified by sputum and blood cultures , and indirect immunofluorescent assay. The mean age of the patients in our study was 56.07±16.52. 39.9% of patients were found to be more than 60 years of age. Similar age distribution was seen in a study by S Bansal et al, where 42% of 70 patients enrolled in the study belonged to sixth and seventh decade of life. In a study done by Aroma et al, the mean age group suffering from CAP was 40 years with 20.17% of the cases having age greater than 70 years .Astudy done in Finland found that the rate of CAP increased for each year of age over 50 years. Pneumonia is a major threat to older people, with an annual incidence for non-institutionalized patients estimated at between 25 and 44 per 1000 population, up to four times that of patients younger than 65 years. Based on sputum and blood culture, and Indirect Immunofluorescence assay, patients were classified as having typical and atypical pneumonia. Of the 122 patients, 40.2% of patients were found to have typical organisms and 20.5 % had atypical organisms causing pneumonia. Higher incidence of atypical pneumonia were found in a study done by Oberoi et al in 233 patients in Ludhiana, atypical pathogens were isolated in 34% of cases . Studies such as that by Jang Wook et al in Korea [12] and Cunha et al inUSA have showed atypical pathogens in 18.5% and 15 % of the cases, respectively. In our study, in 39.3 percent of the cases no etiological organism could be demonstrated. Similar findings were observed in study done by Bansal et al in 70 patients CAP where the etiology could not be ascertained in 35.4% of the patients In our study 18.9 % of the 122 patients were alcoholics. 45.1 % were smokers out of which 84% were men. There was no significant

difference in these habits between the patients with atypical or typical pneumonia. On the contrary, Bilal et al found that in their study smoking was the most important risk factor (72%) in their study [8]. In another study , Nuorti et al studied 228 patients and 301 control subjects out of which fifty-eight percent of the patients and 24 percent of the control subjects were current smokers. He found that cigarette smoking is the strongest independent risk factor for invasive pneumococcal pneumonia among immunocompetent, nonelderly adults. Smoking leads to alteration in respiratory flora, mechanical clearance, and cellular defenses. It also leads to reduction in ciliary beat frequency and changes in volume and viscoelastic properties of respiratory secretions. In the study done by Bilal et al in elderly patients, cough was the most common respiratory symptom noted in 37 (74%) patients, which was productive in only 29 (58%) patients. Other common symptoms included dyspnea (22%), chest pain (20%), altered sensorium (16%), and gastrointestinal symptoms (8%) . There were no significant differences between the symptoms of typical and atypical pneumonia in this study. Similar findings were seen in study by Bilal et al where lobar pneumonia was the most common radiological finding seen in 39 (78%) patients of which 26 patients. Bronchopneumonia was noted in 9 (18%) patients and interstitial pneumonia in 2 (4%) patients, and cavitation in 2 (4%) patients. In the study done by Bansal et al the pattern of lung infiltration was lobar in 56 (80%) and interstitial in 14 (20%) patients [9] In our study , out of the 122 patients ,86.9% did not have any organism isolated by sputum culture. Streptococcus pneumonia was isolated by sputum culture in 15.6% of the 122 cases, Hemophilus influenza was isolated in 6.6% of the cases, Klebsiella pneumonia in 8.2% of the cases , Staphylococcus aureus in 3.3% of cases, Pseudomonas aeroginosa in 3.3 %and E Coli in 1.6% of the total 122 cases. Culture positivity rates were similarly low in other studies such as the study by Oberoi al were blood culture was positive in only 22 % of the cases. Much lower rates were observed in another study done by Shah B A et al ,were blood culture positivity was only 6 %. [10]Yet another study done by Dunalisio et al in Brazil showed positive blood culture result only in 8.2% of cases [11]. Such low rates of positive cultures in various studies emphasizes the difficulty in diagnosing the etiology of pneumonia. We performed Indirect immunofluorescence assay in patients with possibility of atypical pneumonia. The test was negative in 4.9% (2) of cases. The most common atypical organism that was isolated was Mycoplasma pneumonia in 7.4% of cases and Legionella in 5.7% of cases . Coxiella brunette was diagnosed in 3.3% of cases, Chlamydophilia psittaci in 2.5 % of cases and Influenza virus in 1.6 % of total cases. In our study we have found that a differentiation of typical and atypical pneumonia cannot be made based on clinical features alone. This is substantiated by similar findings in several other studies. One of the demerits of the study is that serological investigation for atypical pneumonia was performed only in patients who satisfied the Japanese Respiratory Society Guidelines. This may have caused us to miss several of the mixed infections. Also atypical pneumonia may also mimic typical pneumonia in clinical features and laboratory findings; making diagnosis further more difficult. Hence specific investigations such as serology are required for accurate diagnosis and treatment especially of atypical organisms.

VI. Conclusion

The proportion of typical and atypical pathogens found in our study is 40.2% and 20.5% respectively, The differentiation of typical and atypical organisms by clinical evaluation alone is difficult. Hence appropriate serological investigation and prompt treatment is important to prevent complications and mortality.

References

[1]. Wei Shen Lim, Simon Baudouin, Robert George et al The British Thoracic Society Guidelines for the management of Community acquired pneumonia in adults Update 2009. Thorax Vol 64 Supplement III

[2]. Ishida T, Miyashita N, Nakahama C ―Clinical differentiation of atypical pneumonia using Japanese guidelines‖ Respirology. 2007; 12 (1): 104-10.

[3]. Levya M L, Jeuneb I L et al ―Primary care summary of the British Thoracic Society Guidelines for the management of community acquired pneumonia in adults‖ Primary Care Respiratory Journal 2010; 19(1): 21-27

[4]. Gupta D, Agarwal R et al ―Guideline for diagnosis and management of Community and Hospital acquired pneumonia in adults: Joint ICS/NCCP (I) recommendations.‖ Lung India, 2012; Suppl 2: 27-62.

[5]. Mandell LA, Wunderink R. ―Pneumonia‖ Harrison's principles of internal medicine, 18th edition, New York: McGraw-Hill 2008;2: 1619-1628

[6]. Niederman SM, et al. Guidelines for the Management of Adults with Community-acquired Pneumonia. Am J Respir Crit Care Med 2001; 163: 1730–54.

[7]. National Center for Health Statistics. National Vital Statistics Report. Deaths: Final Data for 2006. Vol. 57, 14 April 2009.

[8]. Bilal Bin Abdullah, Mohammed Zoheb, Syed Mustafa Ashraf, Sharafath Ali, and Nida Nausheen, ―A Study of Community-Acquired Pneumonias in Elderly Individuals in Bijapur, India,‖ ISRN Pulmonology, vol. 2012, Article ID 936790, 10 pages, 2012. doi:10.5402/2012/936790

[9]. Bansal S, Kashyap S, Pal LS, Goel A. Clinical and Bacteriological Profile of Community Acquired Pneumonia in Shimla, Himachal Pradesh. Indian J Chest Dis Allied Sci 2004; 46: 17-22.

[10]. Shah B A, Singh G, Naik M A, Dhobi G N. Bacteriological and clinical profile ofCommunity acquired pneumonia in hospitalized patients. Lung India. 2010;27:54–57.

[11]. Donalisio, Maria Rita; ARCA, Carlos Henrique Mamud and MADUREIRA, Paulo Roberto de. Clinical, epidemiological, and etiological profile of inpatients with community-acquired pneumonia at a general hospital in the Sumaré microregion of Brazil. J. bras. pneumol. . 2011, vol.37, n.2 [cited 2014-10-26], pp. 200-208 .

[12]. Sohn JW, Park SC, Choi YH, Woo HJ, Cho YK, Lee JS, Sim HS, Kim MJ. Atypical pathogens as etiologic agents in hospitalized patients with community- acquired pneumonia in Korea: a prospective multi-center study. J Korean Med Sci2006;21:602–607.
[13]. Ruiz M, Ewig S, Marcos MA, Martinez JA, Arancibia F, Mensa J, et al. Etiology of community-acquired pneumonia: impact of age, comorbidity, and severity. Am J Respir Crit Care Med 1999;160: 397–405.
[14]. Ngeow Y F, Suwanjutha S et al -An Asian study on the prevalence of atypical respiratory pathogens in community-acquire pneumonia‖ International Journal of Infectious Diseases 2005; 9: 144—153
[15]. Riquelme R, Torres A, el-Ebiary, M, Mensa J, Estruch R, Ruiz M, et al.Community- acquired pneumonia in the elderly: clinical and nutritional aspects. Am J Respir Crit Care Med 1997; 156: 1908–1914.
[16]. Almirall J, Gonzalez CA, Balanzo X, Bolibar I. Proportion of community acquired pneumonia attributable to tobacco smoking. Chest 1999; 116 : 375-79.
[17]. Sherman CB. The health consequences of cigarette smoking : Pulmonary diseases.Med Clin North Am 1992; 76 : 355-75.
[18]. Barlett JG, Dowell SF, Mandell LA, File TM, Jr, Musher DM, Fine MJ. Practiceguidelines for the management of community-acquired pneumonia in adults. Infectious Diseases Society of America. Clin Infect Dis. 2000;31:347–82
[19]. D. Lieberman, P. Shrvartzman, K. Korsonsky, D. Lieberman Diagnosis of ambulatory community-acquired pneumonia. Comparison of clinical assessment versus chest X-ray Scand J Prim Health Care, 21 (2003), pp. 57–60

Dr. Naveen Kumar, et. al. "Study of Clinical and Etiological Profile of Community Acquired Pneumonia with Special Reference to Atypical Pneumonia." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(05), 2022, pp. 42-46.