

Original Research

To Determine The Etiology In Hospitalized Patients In Community-Acquired Pneumonia.

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ABSTRACT

Background: Community-acquired pneumonia (CAP) remains an important cause of morbidity and mortality in industrialized countries. The need to estimate regional incidence and prevalence of the disease with its diverse etiology is justified by the shifting patterns and rising incidence of CAP. Thus, the present study was conducted to determine the etiology, risk factors and outcome in hospitalized patients with community acquired pneumonia at our institute

Material and methods: 300 patients with presumed pneumonia; presenting with symptoms of acute respiratory infection in the emergency department, medicine ward and intensive care unit (ICU). A thorough demographic history and clinical history were obtained in the pre-designed study proforma. The clinical examination was done at the time of presentation and investigations which are part of evaluation like hemogram, metabolic profile, chest X-ray, radio-imaging, etc. was done. Outcome of the patient was assessed at the time of discharge

Results: Mean age of the patients was 52.85 years. Among 78 percent of the patients, the etiology was COVID 19. In 10 percent of the patients, CAP was of bacteriological etiology (Klebsiella) while 2.67 percent of the patients with CAP had viral etiology (Influenza A H1N1). Tuberculous etiology was seen in 5 percent of the patients while etiology was unknown in 4 percent of the patients. Mortality rate among patients with COVID-19 etiology was significant higher in comparison to patients with other etiologies.

Conclusion: Long recognized as a major cause of death, CAP has been studied intensively since decades ago, the result of which led to many formative insights in modern microbiology, despite this research and the development of anti-microbial agents, pneumonia remains a major cause of complications and death

Keywords- PNEUMONIA , RESPIRATORY , COVID 19

Keywords: Colorectal Cancer, Carcinoembryonic Antigen, Serum CEA, TNM Staging, Pathological Grading, Diagnostic Biomarker.

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INTRODUCTION

The primary job of the lungs, which are the building blocks of the respiratory system, is to enable gas exchange between the environment and the blood. The alveoli carry oxygen to the capillary network, where it can enter the arterial system and eventually perfuse tissue. The nose, oropharynx, larynx, trachea, bronchi, bronchioles, and lungs make up most of the respiratory system. Over three hundred million alveoli are separated into individual lobes, which are then further divided into individual lobes. The main site of gas exchange is in the alveoli.[1]

An infection of the lung that typically affects the alveolar space is referred to as pneumonia. Pneumonia is further categorised in a number of ways. The most

typical classification is made based on the patient's location at the time of infection. On the basis of location, it is classified into community acquired pneumonia, hospital-acquired pneumonia as well as ventilator-acquired pneumonia. In community acquired pneumonia, the infection is acquired in the community. When the infection is acquired after a hospital stay of over 48 hours or when someone gets recently discharged from the hospital and gets infected within 7 days of discharge, it is called hospital acquired pneumonia. And when it is acquired by a patient admitted to the ICU who is mechanically ventilated for over 48 hours, it is called ventilator-acquired pneumonia.[2]

Typically, pneumonia that develops in immunosuppressed hosts requires special care. The range of possible infections is typically bigger the more immunological impairment there is. The clinical presentation may change if the typical signs of infection, which are partially correlated with the host immune response, are absent.[3] Community-acquired pneumonia (CAP) remains an important cause of morbidity and mortality in industrialized countries. The need to estimate regional incidence and prevalence of the disease with its diverse etiology is justified by the shifting patterns and rising incidence of CAP. Thus, the present study was conducted to determine the etiology, risk factors and outcome in hospitalized patients with community acquired pneumonia at our institute

MATERIALS AND METHODS

The study was conducted on patients with presumed pneumonia who presented with symptoms of acute respiratory infection in various settings such as the emergency department, medicine ward, and intensive care unit (ICU). Over a 15-month period, all patients with complaints of fever, cough, chest pain, and breathing difficulty, and who met the inclusion criteria, were included in the study after giving informed consent. Clinical examinations were performed at the time of presentation, and standard investigations such as haemogram, metabolic profile, chest X-ray, and radio-imaging were conducted as part of the evaluation. Patient outcomes were assessed at the time of discharge. Inclusion criteria encompassed patients over 18 years of age, willing to participate after providing informed consent, exhibiting two or more of the specified symptoms,

and showing new infiltrates on radio-imaging. Exclusion criteria included the absence of consent, age below 18 years, patients with hospital-acquired pneumonia (HAP), those undergoing treatment for malignancy, and individuals using immunosuppressive medication. Written informed consent was obtained from patients who satisfied the eligibility criteria. Upon enrollment into the study, a clinical history was obtained, followed by a detailed clinical examination. Subsequently, patients underwent routine laboratory investigations, including CBC, LFT, RFT with electrolytes, uric acid, blood sugar, CRP, ABG, chest X-ray, and blood culture sensitivity. Special investigations such as sputum analysis, anti-SARS-CoV-2 antibodies, PCR testing for H1N1 and SARS-CoV-2 from nasopharyngeal swabs, pleural fluid analysis, Galactomannan, (1,3)- β -D-glucan (Fungitell), Procalcitonin, CECT chest, and bronchoscopy were conducted where indicated. The study duration spanned 15 months. Patient outcomes were followed throughout their hospital stay, including ICU admission, the requirement for mechanical ventilation, and any complications related to the disease process. Statistical analysis was performed by describing data in terms of range, mean \pm standard deviation, frequencies, and relative frequencies as appropriate. Statistical calculations were conducted using SPSS version 21.

RESULTS

The present study was conducted to determine the etiology and clinical profile of patients presenting with community acquired pneumonia at our institute. A total of 300 patients were enrolled.

Following results were obtained:

Table 1: Age-wise distribution of patients

| Age group (years) | Number of patients | Percentage |
|-------------------|--------------------|-------------------|
| 18 to 30 | 35 | 11.67 |
| 31 to 40 | 40 | 13.33 |
| 41 to 50 | 55 | 18.33 |
| 51 to 60 | 64 | 21.33 |
| More than 60 | 106 | 35.33 |
| Total | 300 | 100 |
| Mean \pm SD | | 52.85 \pm 12.49 |

Table 2: Gender-wise distribution of patients

| Gender | Number of patients | Percentage |
|---------|--------------------|------------|
| Males | 202 | 67.33 |
| Females | 98 | 32.67 |
| Total | 300 | 100 |

Table 3: Distribution of patients according to clinical profile

| Clinical profile | Number of patients | Percentage |
|---------------------|--------------------|------------|
| Cough | 295 | 98.33 |
| Sputum | 288 | 96 |
| Fever | 297 | 99 |
| Shortness of breath | 238 | 79.33 |
| Chest pain | 119 | 39.67 |

| | | |
|------------|----|-------|
| Hemoptysis | 41 | 13.65 |
| Other | 33 | 11 |

Table 4: Distribution of patients according to duration of illness

| Duration of illness | Number of patients | Percentage |
|---------------------|--------------------|------------|
| Less than 2 weeks | 115 | 38.33 |
| 2 to 4 weeks | 123 | 41 |
| More than 4 weeks | 62 | 20.67 |
| Total | 300 | 100 |

Table 5: Distribution of patients according to etiology of CAP

| Etiology | Number of patients | Percentage |
|------------------|--------------------|------------|
| COVID-19 | 234 | 78 |
| Influenza A H1N1 | 8 | 2.67 |
| Klebsiella | 31 | 10.33 |
| Tuberculous | 15 | 5 |
| Unknown | 12 | 4 |
| Total | 300 | 100 |

Mean age of the patients was 52.85 years. Among 78 percent of the patients, the etiology was COVID 19. In 10 percent of the patients, CAP was of bacteriological etiology (Klebsiella) while 2.67 percent of the patients with CAP had viral etiology (Influenza A H1N1). Tuberculous etiology was seen in 5 percent of the patients while etiology was unknown in 4 percent of the patients. Mortality rate among patients with COVID-19 etiology was significant higher in comparison to patients with other etiologies.

DISCUSSION

Community-acquired pneumonia is a leading cause of hospitalization, mortality, and incurs significant health care costs. As disease presentation varies from a mild illness that can be managed as an outpatient to a severe illness requiring treatment in the intensive care unit (ICU), determining the appropriate level of care is important for improving outcomes in addition to early diagnosis and appropriate and timely treatment.[4,5]

The pathogens causing community-acquired pneumonia can be classified as two types:- (1) Typical agents such as Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis, Staphylococcus aureus, Group A Streptococci, anaerobes, and gramnegative organisms and (2) Atypical agents including Legionella, Mycoplasma, Chlamydia pneumoniae, and C. psittaci. , Influenza, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and other respiratory viruses, have become increasingly detected as pathogens based on molecular detection methods. Worldwide, however S. pneumoniae and H. influenzae are the leading causes of acute bacterial pneumonia.[6,7] Studies have reported mortality rates of hospitalized older patients with CAP ranging from 9% to 33% and doubling as the age is increased from 65 to 69 years. The high incidence of CAP in the older adults is due to the

physiological changes being associated with aging, the respiratory tract and immune system, and the presence of multiple comorbidities. It is important to remember that pneumonia in the elderly may present with few respiratory symptoms and instead may also manifest as geriatric syndrome such as delirium.[8,9,10] Patients with coexisting illnesses such as chronic obstructive pulmonary disease (COPD), diabetes mellitus, renal failure, congestive heart failure, coronary artery disease (CAD), malignancy, chronic neurological disease, and chronic liver disease (CLD) have increased incidence of CAP with increased mortality. Decisions about empiric antibiotic therapy, which has a significant impact on these patients' 77 prognoses, must take into account differences in the epidemiology of the bacteria that cause CAP. Data about the microbiological causes of CAP in developing countries, like India, are scant and less and is hampered by the available data being old and limited by a small sample size and the detection methods having stayed confined to bacterial cultures Hence; under the light of above-mentioned data, the present study was undertaken for assessing the etiology, risk factors and outcome of hospitalized patients with community acquired pneumonia at our institute. A total of 300 patients with CAP were evaluated. 35.33 percent of the patients belonged to the age group of more than 60 years while 21.33 percent of the patients belonged to the age group of 51 to 60 years. 18.33 percent and 13.33 percent of the patients belonged to the age group of 41 to 50 years and 31 to 40 years respectively. Mean age of the patients was 52.85 years. Our results were in concordance with the results obtained by Yadav P et al who also reported similar findings. In their study, 48.2 percent of the patients with CAP belonged to the age group of more than 60 years.[11] In another study conducted by Patil SM et al, 44 percent of the patients belonged to the age group of more than 60 years.[12] In a similar study conducted by Roshni KS et al,

86.67 percent of the patients belonged to the age group of less than 60 years; mean age of the patients being 48.27 years.[13] Our results were also similar to the studies done by Shrestha R et al (51.3 years)[14] , Bansal et al[15] (52.7 years) and Shah et al (53.68 years). [16]

The importance of early detection and intervention in high-risk patients cannot be overstated, as it can potentially improve clinical outcomes. However, further multicenter studies are warranted to gain a deeper understanding of mortality in CAP patients, particularly those who develop complications. By continuing to research and analyze data on CAP, we can strive to enhance patient care and ultimately reduce the burden of this infectious disease.

CONCLUSION

Long recognised as a major cause of death, CAP has been studied intensively since decades ago, the result of which led to many formative insights in modern microbiology, despite this research and the development of anti-microbial agents, pneumonia remains a major cause of complications and death.

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