ORIGINAL RESEARCH

Risk factors of community acquired Pneumonia among the elderly population

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Revised date: 20 December, 2023 Acceptance date: 24 January, 2024

ABSTRACT

Background and Aim: Bacterial and viral infections are frequent aetiologies of CAP. The primary route by which the organisms enter the body is through inhalation; however, the refluxes of the stomach or the aspiration of or pharyngeal secretions are also potential entry routes. Communities obtained although individuals of all ages are susceptible to pneumonia, the elderly are particularly vulnerable. **Material and Methods:** A year was devoted to this endeavour by the Department of Respiratory Medicine at the Tertiary Care Teaching Institute of India. One hundred patients aged 65 and older who were admitted to our hospital for pneumonia during the study period were enrolled in the research. The patients' demographic information, including age, gender, body mass, body temperature, and blood pressure, was collected. It was documented the patient's medical history, comorbidities, and cardiopulmonary function. Electrolyte levels, complete blood picture, haemoglobin estimation, blood glucose levels, kidney function tests, liver function pauses, CRP, and D dimer were recorded as laboratory investigation data. **Results:** Hypertension was the prevailing comorbidity observed in 85 (85%) of the patients. This was followed by cerebrovascular disease in 72 (72%) patients, cardiopathy in 64 (64%) patients, and chronic obstructive pulmonary disease in 59 (59%) patients. Diabetes was present in 44 (44%), while 28 (28% of the patients) had undergone a significant operation in the past. Hypertension was the prevailing comorbidity observed in 85% of the patients. Cerebrovascular disease was present in 72% of the patients, followed by cardiopathy in 64%. Chronic obstructive pulmonary disease was diagnosed in 59% of the patients. Diabetes was present in 44 (44%), while 28 (28% of the patients) had undergone a significant operation in the past. **Conclusion:** Community-acquired pneumonia considerably contributes to the global health burden, particularly by inducing severe morbidity and mortality among the elderly.

Key Words: Chronic Obstructive Pulmonary Disease, Community acquired pneumonia, Elderly, Respiratory Medicine

INTRODUCTION

In industrialized nations, community-acquired pneumonia (CAP) continues to be a significant contributor to both morbidity and mortality. Mortality from CAP has not decreased over the past few decades, notwithstanding the substantial progress made in research, significant enhancements in medical care, and developments in antimicrobial therapy facilitated by the availability of active antibiotics against the known causative pathogens. Primarily, CAP-related mortality rates must be reduced through targeted risk reduction interventions based on the identification and comprehension of risk factors.[1,2]

Although it impacts individuals across all age cohorts, the elderly are particularly vulnerable. As a consequence of pneumonia, the elderly are hospitalised at a higher rate than the younger generation, and their stays are typically longer. Progressive pneumonia in the elderly is characterised by a poor prognosis. Respiratory insufficiency is the lead cause.[3,4] When an individual is 65 years of age or older, they frequently have comorbidities that increase their risk of CAP by a factor of two to three. Age progression, alcoholism, asthma, smoking, immunosuppression, cardiovascular disease, chronic obstructive pulmonary disease, cerebrovascular disease, renal disease, hypertension, and diabetes are reportedly all risk factors for CAP. Dementia and Parkinson's disease are neurodegenerative disorders that contribute to the severity of CAP.[5-7]

Cough accompanied by sputum production, fever, fatigue, decreased appetite, urinary incontinence, and occasionally delirium and dyspnea are the typical symptoms of CAP. Infections caused by bacteria and viruses are frequent CAP triggers. The primary route by which the organisms enter the body is through inhalation; however, the reflux of the stomach or the

aspirations of oropharyngeal secretions are also potential entry routes.[8]

MATERIAL AND METHODS

A year was devoted to this endeavour by the Department of Respiratory Medicine at the Tertiary Care Teaching Institute of India. One hundred patients aged 65 and older who were admitted to our hospital for pneumonia during the study period were enrolled in the research. Information regarding these patients was obtained from the medical records department's case sheets. Pneumonia was diagnosed on the basis of a chest radiogram performed prior to or within forty-eight hours of admission in patients who presented with a history of coughing with or without expectorant, chest pain, and dyspnea. The sanction of an ethical committee was acquired.

The case reports of patients who passed away during the duration of the investigation were omitted from the analysis. Incomplete clinical case documents and unfinished treatment records were deemed ineligible for inclusion in the study.

The patients' demographic information, including age, gender, body mass, body temperature, and blood pressure, was collected. It was documented the patient's medical history, comorbidities, and cardiopulmonary function. Electrolyte levels, complete blood picture, haemoglobin estimation, blood glucose levels, kidney function tests, liver function pauses, CRP, and D dimer were recorded as laboratory investigation data. ABG analysis and specifics of chest X-rays or ultrasounds were also recorded. Particulars regarding the blood culture and sensitivity as well as sputum culture and sensitivity for the patients were also documented. When sputum was not accessible, fluid from bronchoalveolar lavage (BAL) was utilised for culture. The gramme stain was performed on each of the samples as well.

STATISTICAL ANALYSIS

Following the compilation and entry of the recorded data into a spreadsheet application (Microsoft Excel 2007), the information was exported to the data editor tab of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). The levels of significance and confidence were established at 5% and 95%, respectively, for every test.

RESULTS

The study enrolled a cohort of one hundred patients, each of whom documented all pertinent information on their case record. There were 56 males (56 percent) and 44 females (44 percent). Hypertension was the prevailing comorbidity observed in 85% of the patients. Cerebrovascular disease was present in 72% of the patients, followed by cardiopathy in 64%. Chronic obstructive pulmonary disease was diagnosed in 59% of the patients. Diabetes was present in 44 (44%), while 28 (28% of the patients) had undergone a significant operation in the past. (Table 1).

Klebsiella pneumoniae was identified in 69 (69%) of the sputum cultures as the predominant bacterial organism, followed by Psudomonas aeruginosa in 48 (48%) and Candida albicans in 52 (52%), and Acinetobacter baumanni in 44 (44%). However, Klebsiella pneumoniae was the most frequently isolated organism in blood cultures, followed by Pseudomonas aerugicosa.

When considering the patients, hypothyroidism predominated in 48% of the cases. In 10 patients, hydrothorax was observed bilaterally, while in 7 patients (12.5%), it was observed unilaterally. Laboratory investigations identified abnormal liver functions in 55 of the patients.

Twenty-five patients required suction, and nineteen of those patients were transported to the hospital in an incapacitated state. A mechanical ventilator was required in fourteen of the instances. The patients had an average haemoglobin level of 10.50 ± 2.20.

Table 1: Comorbidities among patients with pneumonia

Comorbidity	Number	Percentage (%)
Hypertension	85	85
Cerebrovascular disease	72	72
COPD	59	59
Cardiopathy	64	64
Diabetes	44	44
Benign Prostatic Hyperplasia	23	23
Surgery	28	28
Electrolyte abnormalities	16	16
Chronic neuropathy	5	5
Others	10	10

DISCUSSION

Diagnosing pneumonia in the elderly presents a greater challenge compared to younger age groups due to the potential absence of classic symptoms. Community-acquired pneumonia, on the other hand, is linked to significant morbidity and mortality. A proper and early diagnosis requires consideration of several risk factors, including but not limited to intoxication and smoking, altered sensorium, obesity, diabetes, hypertension, advancing age, and chronic obstructive pulmonary disease (COPD).

Hypertension was the prevailing comorbidity observed in the current study, with cerebrovascular disease, cardiopathy, COPD, and diabetes following

suit in frequency. In the United States, COPD is the most prevalent comorbidity for pneumonia, according to a study by Ramirez et al.[9] In some studies, comorbidities including diabetes, immunosuppressive conditions, chronic pulmonary disease, stroke, congestive heart failure, and malnutrition were also identified as factors that could influence the presence of pneumonia.[9-11] Our study identified smoking and alcoholism as a comorbidity, which was supported by the findings of Ramirez et al., who also identified smoking and excessive alcohol use as comorbidities. In their respective investigations, Torres et al. and Almirall et al. also found that excessive alcohol consumption and smoking are associated with an increased incidence of CAP.[10,11] In a study by Tagliaferri et al., 30–40% of the population was found to have dysphagia, resulting in malnutrition.[12] Additionally, it is crucial that future research validates the impact of additional potential risk factors for CAP that were identified in this review. These encompass a diverse array of determinants, including but not limited to the influence of civil status, ethnicity, regular child contact, inadequate social support, abrupt fluctuations in workplace temperature, compromised quality of life, physical activity, prior hospital admissions and outpatient visits, HTLV-1 and HIV infections, epilepsy, stroke, thyroid dysfunction, connective tissue diseases, pulmonary tuberculosis, anaemia, depression, dementia, and oxygen therapy, in addition to treatment with A limited number of individual studies have assessed each of these factors inconsistently, rendering definitive conclusions impossible.

The predominant bacterial species identified in the current investigation was Klebsiella pneumoniae, followed by Pseudomonas aeruginosa at 48.2%, Candida albicans at 51.8%, Acinetobacter baumanni at 44.6%, and Staphylococcus aureus at 46.4%. The most frequently isolated organism, according to a study conducted in Mumbai, was Streptococcus pneumoniae. Gram-negative bacilli, including Pseudomonas and Klebsiella, came in second.[13] An additional study conducted in South East Asia found Streptococcus pneumoniae to be the most frequently isolated organism. However, this finding raises concerns regarding the presence of multidrug-resistant Klebsiella and Pseudomonas.[14-16]

In our study, the CRP levels were 10.40 ± 2.8 mg/dL. An association between CAP and elevated CRP levels has been documented in a study by Moberg et al.[17]. According to a study by Majumdar et al., an oxygen saturation of less than 90% is diagnostic of CAP.[18] Li et al. reaffirmed the correlation between elevated CRP levels and an increased risk among elderly patients in their study.[19] C reactive proteins are members of the pentraxin protein family; their increase in expression is nonspecific despite the fact that they function as extremely sensitive inflammation markers. D-dimers are typically associated with coagulation factors; therefore, elevated levels would indicate lung injury.[20]

In 11% of the patients, hydrothorax was detected in both lungs, whereas in 12%, it was observed in only one lung. In 14% of the cases, mechanical ventilation was required, while non-invasive ventilation was necessary in 34%.

Age, smoking, malnutrition, environmental exposures, prior CAP, chronic bronchitis/COPD, asthma, functional impairment, poor dental health, immunosuppressive therapy, oral steroids, and gastric acid-suppressing drugs are all significant definitive risk factors for CAP, as demonstrated by the present findings. Because some of these risk factors are modifiable and amenable to effective interventions, clinicians should be cognizant of them. Proficient monitoring of functional impairment, oral hygiene practises, antacid drug reduction, and rehabilitation protocols ought to receive particular emphasis. Observational studies are susceptible to a multitude of sources of bias, which compromises the robustness of the evidence they yield in comparison to experimental studies.

CONCLUSION

Pneumonia acquired in the community considerably contributes to the global health burden, particularly among the elderly, where it causes severe morbidity and mortality. Therefore, early detection is crucial for the condition. It is crucial to diagnose and identify risk factors in order to mitigate the progression of the infection and thus improve the prognosis.

Sources of funding: Nil.
Conflict of interest: None declared.

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