

Risk Factors of Community Acquired Pneumonia among Geriatric Population

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Abstract: *Introduction:* Pneumonia in the elderly is a common and serious problem with a clinical presentation that can differ from that in younger patients. Older patients with pneumonia complain of significantly fewer symptoms than do younger patients, and delirium commonly occurs. Clinically pneumonia is characterized by a variety of symptoms and signs. Cough (which may be productive of purulent, mucopurulent, or “rust-coloured” sputum), fever, chills, and pleuritic chest pain are among its manifestations. *Material and methods:* This is a prospective and observational study conducted in the Pulmonary Medicine, Kurnool Medical College from March 2018 to April 2019. Patients were questioned on clinical history, lifestyle habits and using a standard questionnaire. Anthropometry and a physical examination were performed for all participants in a standardized manner. This study carried out on 60 cases of community-acquired pneumonia of patients aged >65 years. *Results:* Patients presented with both typical and atypical symptoms. Among the typical respiratory symptoms, cough was present in 45 (75%) patients, expectoration in 39 (65%) patients, 23 had mucopurulent sputum, and 10 patients had mucoid sputum, fever in 33 (55%) patients, dyspnoea in 15 (25%), and pleuritic chest pain in 12 (20%) patients. The most common bacterial organism to be isolated from the sputum cultures was *Klebsiella pneumoniae* in 42 (70.0%), *Pseudomonas aeruginosa* in 30 (50 %), *Candida albicans* in 30 (50%) and *Acinetobacter baumannii* in 27 (45%). In blood culture however, the most common organism to isolated was *Klebsiella pneumoniae* in 10 (16.7%) followed by *Pseudomonas aeruginosa* in 5 (8.4%). *Conclusion:* Community-acquired pneumonia in elderly patients is a common and serious problem encountered in clinical practice. Elderly patients with community-acquired pneumonia have different clinical presentation and higher mortality. Elderly patients may present with atypical symptoms like altered sensorium and gastrointestinal symptoms, other than the typical respiratory symptoms of pneumonia.

Keywords: Comorbidities, Aspiration pneumonia, COPDs.

INTRODUCTION

Pneumonia is an infection involving the alveoli and bronchioles. It may be caused by bacteria, viruses, or parasites. Clinically pneumonia is characterized by a variety of symptoms and signs. Cough (which may be productive of purulent, mucopurulent, or “rust-coloured” sputum), fever, chills, and pleuritic chest pain are among its manifestations. Extrapulmonary symptoms such as nausea, vomiting, or diarrhoea may

occur. ^[1]

Pneumonia is a common and often serious illness. It is the sixth leading cause of death. About 600,000 persons with pneumonia are hospitalized each year, and there are 64 million days of restricted activity due to this illness. The caregiver caregiving is associated with an increased mortality rate among the caregivers. ^[2] The burden associated with pneumonia has not been measured, although we know that long term mortality rate among persons providing long-term care and experiencing strain has been reported to be 63% higher than among no caregiving control subjects. ^[3] Therefore the aim of this study was to evaluate the absorbed radiation doses (AD) to the skin, uterus, and ovaries during UAE.

Pneumonia in the elderly is a common and serious problem with a clinical presentation that can differ from that in younger patients. Older patients with pneumonia complain of significantly fewer symptoms than do younger patients, and delirium commonly occurs. Indeed, delirium may be the only manifestation of pneumonia in this group of patients. ^[4] Alcoholism, asthma, immunosuppression, and age ≥65 years are risk factors for community acquired pneumonia in the

elderly. Among nursing home residents, the following are risk factors for pneumonia: advanced age, male sex, difficulty in swallowing, inability to take oral medications, profound disability, bedridden state, and urinary incontinence. [5]

Streptococcus pneumoniae is the most common cause of pneumonia among the elderly. Aspiration pneumonia is underdiagnosed in this group of patients, and tuberculosis always should be considered. In this population an etiologic diagnosis is rarely available when antimicrobial therapy must be instituted. Use of the guidelines for treatment of pneumonia issued by the Infectious Diseases Society of America, with modification for treatment in the nursing home setting, is Recommended. [6]

There is a spectrum of physical findings, the most common of which is crackles or rales in the lungs. Other findings in the lungs may include dullness to percussion, increased tactile and vocal fremitus, bronchial breathing, and a pleural friction rub. It is important to remember that pneumonia in the elderly may present with few respiratory symptoms and signs and instead may be manifest as delirium, worsening of chronic confusion, and falls. [7]

Falls are usually an indication that the person is ill. Among the healthy elderly, rough or slippery ground accounted for 54% of falls, but in the sick elderly this factor accounted for only 14% of falls. Dizziness, syncope, cardiac and neurological disease, poor health status, and functional disability are more likely to account for falls among the sick elderly. [8]

Recovery is prolonged in the elderly, especially the frail elderly who may require up to several months to return to their baseline state of mobility. Indeed, hospitalization, with its enforced immobility, often hastens functional decline in the elderly; 25%–60% of older patients experience a loss of independent physical function while being treated in the hospital. [9] Older patients with pneumonia complain of fewer symptoms than do younger patients with pneumonia; patients aged 45–64, 65–74, and >75 years had 1:4, 2:9, and 3:3 fewer symptoms respectively than patients aged 18–44. [10]

MATERIAL AND METHODS

This is a prospective and observational study conducted in the Department of Pulmonary Medicine, Kurnool Medical College from March 2018 to April 2019. Patients were questioned on clinical history, lifestyle habits and using a standard questionnaire. Anthropometry and a physical examination were performed for all participants in a standardized manner. A full haemogram, glycosylated haemoglobin (HbA1C) test and blood grouping were also performed.

This study carried out on 60 cases of community-acquired pneumonia of patients aged >65 years. Prior to the study, the positive protocol was approved by the institutional ethical committee, and all patients gave their informed consent to participate.

Inclusion Criteria: They are following: age >65 years, clinical symptoms like fever, cough with or without expectoration, pleuritic chest pain, dyspnoea, and altered sensorium and clinical signs like tachypnea, reduced chest movements, dull percussion note, bronchial breath sounds, increased vocal fremitus, and vocal resonance and crepitation. Radiological evidence of pneumonia without any clinical evidence of pneumonia will also be included.

Exclusion Criteria: Hospital acquired pneumonia that is patient hospitalized in the previous 14 days. HIV status. Tuberculosis. Lung malignancies.

Statistical analysis:

The data was analysed by Mean $\pm$ SD (standard deviation), percentage, and Chi square test (P value <0.05 was considered significant).

RESULTS

In table 1, the age group of patients varied from 65 to 90 years. Mean age was 69.14 ± 6.24 years. Majority of patients were in the age group 65–74 years.

Table 1: Distribution of Age group.

Age in years	No. of patients	Percentage
65–74	39	65%
75–84	15	25%
≥85	6	10%

Table 2: Distribution of Gender.

Gender	No. of patients	Percentage
Male	40	70%
Female	20	30%

Out of 60 patients, 40 (70%) were males, and 20 (30%) were females. The detail of Gender distribution is shown in Table 2.

Table 3: Showing predisposing conditions.

Predisposing conditions	No. of patients	Percentage
Smoking	45	75%
Alcoholism	9	15%
COPD	30	50%
Diabetes mellitus	15	25%
Congestive cardiac failure	9	15%
Neurologic diseases	6	10%
Renal diseases	3	5%

Chronic liver diseases	3	5%
Malignancy	1	2%

In table 3, among the predisposing conditions, COPD was the most common, noted in 30 (50%) patients. Other predisposing conditions noted were diabetes mellitus in 15 (25%) patients, congestive cardiac failure in 9 (15%), neurologic diseases in 6 (10%) patients, renal diseases in 3 (5%) patients, chronic liver disease in 3 (5%) patients, and malignancy in 1 (2%) patient. Among habits, smoking was most common noted in 45 (75%) patients followed by alcoholism in 9 (15%) patients.

Table 4: Table showing symptomatology

Presenting symptoms	No. of patients	Percentage
Cough	45	75%
Expectoration	39	65%
Fever	33	55%
Dyspnea	15	25%
Pleuritic chest pain	12	20%
Altered sensorium	9	15%
Gastrointestinal symptoms	6	10%

In table 4, patients presented with both typical and atypical symptoms. Among the typical respiratory symptoms, cough was present in 45 (75%) patients, expectoration in 39 (65%) patients, 23 had mucopurulent sputum, and 10 patients had mucoid sputum, fever in 33 (55%) patients, dyspnoea in 15 (25%), and pleuritic chest pain in 12 (20%) patients. Among the atypical symptoms altered sensorium was present in 9 (15%) patients and gastrointestinal symptoms of anorexia, nausea, vomiting, or diarrhoea in 6 (10%) patients.

Table 5: General physical examination.

Signs	No. of patients	Percentage
Pallor	15	25%
Icterus	6	10%
Cyanosis	6	10%
Clubbing	3	5%
Pedal oedema	6	10%

In table 5, Findings on General Physical Examination: General physical examination of the patient showed pallor in 15 (25%) patients, icterus in 6 (10%) patients, cyanosis in 6 (10%) patients, clubbing in 3 (5%) and pedal oedema in 6 (10%) patients.

Table 6: Bacterial organisms isolated in sputum and blood cultures.

Organisms	Sputum Culture	Blood Culture
Acinetobacter baumannii	27 (45%)	-

Klebsiella pneumoniae	42 (70%)	10 (16.7%)
Pseudomonas aeruginosa	30 (50%)	5 (8.4%)
Streptococcus pneumoniae	20 (33.4%)	-
Staphylococcus aureus	28 (46.7%)	3 (5%)
E. coli	14 (23.4%)	5 (8.4%)
Candida albicans	30 (50%)	2 (3.4%)
Proteus mirabilis	3 (5%)	1 (1.8%)
Enterobacter spp	1 (1.7%)	-

In table 6, the most common bacterial organism to be isolated from the sputum cultures was Klebsiella pneumoniae in 42 (70.0%), Pseudomonas aeruginosa in 30 (50 %), Candida albicans in 30 (50%) and Acinetobacter baumannii in 27 (45%). In blood culture however, the most common organism to isolated was Klebsiella pneumoniae in 10 (16.7%) followed by Pseudomonas aeruginosa in 5 (8.4%).

Table 7: Laboratory Investigations

Investigations	Mean $\pm$ SD
Haemoglobin gm/dL	11.36 $\pm$ 3.24
White Blood Cells ($\times 10^9$ /L)	10.32 $\pm$ 3.11
Neutrophil%	71.43 $\pm$ 9.54
Lymphocyte %	16.43 $\pm$ 6.64
Platelets	2.54 lakhs
CRP (mg/dL)	10.23 $\pm$ 2.91
Blood Glucose (mg/dL)	103.43 $\pm$ 6.54
D Dimer (ng/mL)	275.4 $\pm$ 62.19

Table 8: Radiological findings

Radiological findings	No. of Patients	Percentage
Lobar pneumonia	46	76.7%
Bronchopneumonia	11	18.4%
Interstitial pneumonia	2	3.4%
Pleural effusion	7	11.7%
Cavitation	3	5%

DISCUSSION

These results suggest that several of the risk factors for pneumonia is common to both developed and developing countries. These include smoking tobacco, exposure to animals, recent URTI and anaemia. The results have also identified novel modifiable risk factors, such as the use of snuff (ground tobacco) and khat, which are particular to this population. Community-acquired pneumonia (CAP) is a frequent cause of hospital admission and mortality in elderly patients worldwide. The clinical presentation, etiology, and outcome of community-acquired pneumonia in elderly differs from that of other population. In the present study, 50 patients of community-acquired pneumonia >65 years of age were included. [11]

Older age is an important risk factor for CAP and is associated with elevated morbidity and mortality due to the physiological changes associated with aging and a greater presence of chronic disease. There is a

strong association between advanced age and the decline in the integrity of physical barriers protection against invading pathogens, age-related changes in the immune system and malnutrition which make this population more vulnerable to CAP, and clinicians should pay close attention to this entity due to increased life expectancy in the coming years. ^[12]

In this study males 40 (70%) were affected more than females 20 (30%). This gender distribution is similar to study conducted by Riquemele *et al.* where 67% were males and 33% were females, and this may be attributed to increased rates of alcoholism and smoking in males and also due to the increased association of comorbid conditions like COPD, congestive cardiac failure and others in males. ^[13]

Smoking was the most important risk factor (75%) in our study. The increased risk of pneumonia in smokers is due to alteration in respiratory flora, mechanical clearance, and cellular defences. Bacterial colonization of lower respiratory tract is more prevalent in smokers than non-smokers, mucociliary clearance is defective in smokers, owing to a reduction in ciliary beat frequency and changes in volume and viscoelastic properties of respiratory secretions. In a population-based case-control study, Nuorti *et al.* found that cigarette smoking was the strongest independent risk factor for invasive pneumococcal disease. ^[14]

Alcohol abuse has been associated with increased risk and more severe presentation of CAP. Alcohol consumption affects all components of the adaptive immune system (cellular and humoral immunity). People with heavy alcohol consumption frequently developed liver damage, malnutrition and poor personal hygiene, which also affect immunity and increased risk for pneumonia. ^[15]

In this study general, physical examination of the patient showed pallor in 15 (25%) patients which may be secondary to infection, associated comorbid conditions, and malnutrition. Icterus was observed in 6 (10%) patients. Icterus is commonly described in streptococcal pneumonia infections and also in others as part of multi-organ dysfunction and also due to underlying chronic liver disease in some patients. Central cyanosis observed in 6 (10%) patients. Central cyanosis is explained due to shunting of blood through consolidated lung. ^[16]

In our study, fever, the most frequently noted symptom of infection occurs less frequently in elderly. In our study fever was noted in 33 (55%) of patients. Poor febrile response was correlated to decrease release of IL-1 in elderly patients ^[17]. Hypothermia is noted in 1 (2%) patient and is associated with poor prognosis. Septic shock secondary to pneumonia is commonly seen in elderly, and this may account for hypotension seen in 8 (16%) of patients. ^[18]

In our study, the most common bacterial organism to be isolated from the sputum cultures was *Klebsiella pneumoniae* in 42 (70.0%), *Pseudomonas aeruginosa* in 30 (50 %), *Candida albicans* in 30 (50%) and *Acinetobacter baumannii* in 27 (45%). In blood culture however, the most common organism to isolated was *Klebsiella pneumoniae* in 10 (16.7%) followed by *Pseudomonas aeruginosa* in 5 (8.4%). A study in Mumbai reported *Streptococcus pneumoniae* to be the most common organism isolated followed by Gram negative bacilli such as *Pseudomonas* and *Klebsiella*. ^[19]

While the vaccine remains, the best known and best studied pneumonia prevention strategy, it is important to recognize the modifiable risk factors that are related to the onset of pneumonia. Dysphagia is a major risk factor for pneumonia, its screening and management is also important to prevent malnutrition, dehydration and xerostomia. Controlling lifestyle related risk factors such as smoking, and alcohol consumption could decrease the risk of pneumonia, even in elderly patients. A careful review of the prescribed medications and a close monitoring of side effects can also reduce the risk of pneumonia. Maintaining teeth and thus chewing muscle mass can improve oral function, nutritional and functional status. Simple everyday practices such as oral biofilm removal or removing the denture before bedtime is easy to implement and efficient measures to reduce the risk of pneumonia.

CONCLUSION

Community-acquired pneumonia in elderly patients is a common and serious problem encountered in clinical practice. Elderly patients with community-acquired pneumonia have different clinical presentation and higher mortality. Elderly patients may present with atypical symptoms like altered sensorium and gastrointestinal symptoms, other than the typical respiratory symptoms of pneumonia. They may not have all the classical signs of consolidation and may present with only few signs like tachypnea, tachycardia, and crepitation. The atypical presentations may lead to delay in diagnosis and initiation of treatment and may be responsible for higher observed mortality in elderly patients with pneumonia. Risk factors associated with CAP are age, smoking habit, contact with children, body mass index, previous hospitalization, comorbidities as dementia, chronic respiratory, heart, renal and liver disease, with different impact on mortality of pneumonia. Prevention of pneumonia requires a better understanding of the above population risk factors.

REFERENCES

1. Wang H, Naghavi M, Allen C, Barber RM, Bhutta ZA, Carter A, *et al.* Global, regional, and national life expectancy, all-cause mortality, and cause-

- specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016;388:1459-544.
2. Li W, Ding C, Yin S. Severe pneumonia in the elderly: a multivariate analysis of risk factors. *Int J Clin Exp Med*. 2015;8(8):12463-75
3. de Miguel-Díez J, Jiménez-García R, Hernández-Barrera V, Jiménez-Trujillo I, de Miguel-Yanes JM, MéndezBailón M, et al. Trends in hospitalizations for community-acquired pneumonia in Spain: 2004 to 2013. *Eur J Intern Med* 2017;40:64-71.
4. Gubbins PO, Li C: The influence of influenza and pneumococcal vaccines on community-acquired pneumonia (CAP) outcomes among elderly patients. *Curr Infect Dis Rep* 2015;17: 49.
5. Vila-Córcoles A, Ochoa-Gondar O, Llor C, Hospital I, Rodríguez T, Gómez A: Protective effect of pneumococcal vaccine against death by pneumonia in elderly subjects. *Eur Respir J* 2005;26:1086-1091.
6. Paul KJ, Walker RL, Dublin S: Anticholinergic medications and risk of community-acquired pneumonia in elderly adults: a population-based case-control study. *J Am Geriatr Soc* 2015;63:476-485.
7. Quan TP, Fawcett NJ, Wrightson JM, Finney J, Wyllie D, Jeffery K, et al. Increasing burden of community-acquired pneumonia leading to hospitalisation, 1998-2014. *Thorax* 2016;71:535-42.
8. Trotter CL, Stuart JM, George R, Miller E. Increasing hospital admissions for pneumonia, England. *Emerg Infect Dis* 2008;14:727-33.
9. Capelastegui A, España PP, Bilbao A, Gamazo J, Medel F, Salgado J, et al. Study of community-acquired pneumonia: incidence, patterns of care, and outcomes in primary and hospital care. *J Infect* 2010;61:364-71.
10. Kaplan V, Angus DC, Griffin MF, Clermont G, Scott Watson R, Linde Zwirble WT. Hospitalized community-acquired pneumonia in the elderly: age- and sex- related patterns of care and outcome in the United States. *Am J Respir Crit Care Med* 2002; 165:766e72.
11. Fernandez-Sabe N, Carratala J, Roson B, Dorca J, Verdaguer R, Manresa F, et al. Community-acquired pneumonia in very elderly patients. Causative organisms, clinical characteristics and outcomes. *Medicine (Baltimore)* 2003;82:159e69.
12. Ortqvist A, Hedlund J, Grillner L, Jalonen E, Kallings I, Leitonon M. Aetiology, outcome and prognostic factors in community-acquired pneumonia requiring hospitalization. *Eur Respir J* 1990;3:1105e13.
13. Marston BJ, Plouffe JF, File Jr TM, Hackman BA, Salstrom SJ, Lipman HB, et al. Incidence of community-acquired pneumonia requiring hospitalization. Results of a population-based active surveillance Study in Ohio. The Community-Based Pneumonia Incidence Study Group. *Arch Intern Med* 1997;157(15): 1709e18.
14. Palmer RM. Acute care of the elderly: minimizing the risk of functional decline. *Cleveland Clinic J Med* 1995;62:117-28.
15. Inouye SK, Wagner DR, Acampora D, et al. A predictive index for functional decline in hospitalized elderly medical patients. *J Gen Intern Med* 1993;8:645-52.
16. Metlay JP, Schulz R, Li Y-H, et al. Influence of age on symptoms at presentation on patients with community-acquired pneumonia. *Arch Intern Med* 1997;157:1453-9.
17. Jokinen C, Heiskanen L, Juvonen H, et al. Incidence of community-acquired pneumonia in the population of four municipalities in Eastern Finland. *Am J Epidemiol* 1993;137:977-88.
18. Koivula I, Stenn M, Makela PH. Risk factors for pneumonia in the elderly. *Am J Med* 1994;96:313-20.
19. Collaborators GL. Estimates of the global, regional, and national morbidity, mortality, and aetiologies of lower respiratory tract infections in 195 countries: a systematic analysis for the Global Burden of Disease Study. *Lancet Infect Dis*. 2015