Factors Associated With In – Hospital Mortality in Community Acquired Pneumonia in an Irish District Hospital: A Short Report

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Abstract

Background: Community acquired pneumonia (CAP) is a major health problem worldwide and especially in western countries.

Methods: A retrospective study was done at Cavan General Hospital, Ireland from January to June 2010. The purpose of the study was to find out factors asso-ciated with in–hospital mortality in CAP patients. CAP was defined according to guidelines of British Thoracic Society.

Results: In our study the rate of in-hospital mortality was 23%. Patients who died in hospital had significantly longer duration of hospital stay than those who did not die (14.06, SD $\pm$ 15.3 vs 8.00, SD $\pm$ 9.04, P 0.04). Older age was significantly associated with increased mortality (P < 0.01).Higher CURB – 65 score was also associated with in – hospital mortality (P < 0.01). All the patients (100 %) who died in hospital had co-morbid illness (P < 0.01). Route of antibiotics and admission into ICU were not associated with in-hospital mortality.

Conclusion: Older age, increased severity of pneumonia, and co-morbid illnesses were associated with increased in – hospital mortality in community acquired pneumonia.

Key words: Community acquired pneumonia, older age, mortality.

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Introduction

Community acquired pneumonia (CAP) is a major cause of morbidity, hospitalization, and mortality in western countries. The in – hospital mortality from CAP ranges from 8.1% to 11%, with higher mortality in patients admitted to intensive care unit (ICU).[1-3] Factors affecting mortality in CAP can be patient

factors, pneumonia factors and those related to management during hospital stay. Patient factors, like age, are non-modifiable but factors related to management, like administration of antibiotics according to recommended guidelines are modifiable. Thus it is very important to find out the modifiable factors associated with increased mortality in CAP so that proper measures are taken to address these factors and improve survival in CAP. Garau J et al[2] found that mortality risk was low for those patients of CAP who were administered antibiotics according to recommended protocols and in whom an etiological diagnosis could be made by sputum and / or blood culture.

Many studies have shown that older age is the most important non-modifiable patient – related factor associated with high mortality in CAP.[1,4] Age is an essential component of the two widely used scoring systems for the severity of CAP i.e., CURB – 65, and Pneumonia Severity Index (PSI).[5,6] The aim of our study was to find out factors associated with in-hospital mortality in CAP patients presenting to our hospital.

Patients and Methods

This was a retrospective study done at Cavan General Hospital, Cavan County, Ireland during a six – month period from January to June 2010. Hospital records, which included clinical, laboratory, and follow up data, were reviewed and information was collected on a structured questionnaire. The questionnaire was designed according to the British Thoracic Society (BTS) guidelines for the management of CAP in adults.[7]

Patient population comprised all adults aged > 18 years admitted with the primary diagnosis of CAP during the study period. A diagnosis of CAP was based on (i) new infiltrate on chest x-ray which could not be explained otherwise, and (ii) signs and symptoms of an acute lower respiratory tract infection e.g., cough with or without sputum production, dyspnoea, pleural pain, fever, crackles or bronchial breath sounds on clinical examination.[7] Patients were excluded if they were HIV positive, had cystic fibrosis or pulmonary tuberculosis. Age was categorized as < 50 years, 50 – 75 years, and > 75 years. CURB – 65 score was used to assess severity of CAP.[5] It is a six – point score (0 to 5) with higher scores predicting increased mortality. One point is given for each of following: Confusion; Urea > 7 mmol/L; Respiratory Rate 30 / min; Systolic blood pressure < 90 mm Hg or diastolic blood pressure 60 mm Hg; Age 65 years. In – hospital mortality was

defined as death due to any cause during hospital stay.

Data was analyzed in SPSS version 20. Percentage of patients dying during hospital stay was calculated. Patients who died during hospital stay were compared with patients who were discharged. Chi-square test and Fischer exact test were used for categorical variables and Mann Whitney U test was applied for continuous variables. A two – sided P value < 0.05 was considered significant.

The study was approved by the Ethical Review Board of Cavan General Hospital, Ireland.

Results

Seventy four patients of CAP were included in the study and final analysis. The rate of in-hospital mortality was 23% (17 / 74). Males comprised 52.7% (39 / 74) of the sample. Patients in age category < 50 years were 20.3%; 27% in 50 – 75 years; and 52.7% in age category > 75 years. The percentage of total patients in CURB – 65 categories 0 to 1, 2 to 3, and 4 to 5 were 45.5%, 43.9%, 10.6% respectively. Mean days of hospital stay was 9.36 ± 10.9 days. Patients who died in hospital had significantly longer duration of hospital stay than those who did not die (14.06 ± 15.3 vs 8.00 ± 9.04, P 0.04). Older age was significantly associated with increased mortality (P < 0.01). Among the patients who died in hospital 88% were > 75 years old as compared to 42% of patients who were discharged. Interval between chest x-ray and administration of antibiotics was not associated with in – hospital mortality.

Higher CURB – 65 score was associated with in – hospital mortality. 27% of patients who died in hospital had CURB – 65 score 4 as compared to only 6% of patients who were discharged (P < 0.01). All the patients (100%) who died in hospital had co-morbid illness (P < 0.01). Majority of patients with in – hospital mortality were seen by a consultant in < 12 hours of admission (87% vs 54%, P 0.04). Route of antibiotics and admission into ICU were not associated with in – hospital mortality (Table 1).

Discussion

The in – hospital mortality in our study was 23% which is very high as compared with previous studies[1-3] in which in – hospital mortality is 8.1% to 11%. This can be explained by the fact that our study included

Table 1: Factors associated with in-hospital mortality in CAP.

Variable	In – hospital Mortality		P-value
	Yes	No	
	n (%)	n (%)	
Gender — male	8 (47)	31 (56)	0.50
Age (years)			
< 50	0 (0)	15 (27)	< 0.01
50 – 75	2 (12)	17 (31)	
➢ 75	15 (88)	23 (42)	
CAP confirmed within 4 hours---Yes	8 (53)	24 (63)	0.51
CXR taken and reviewed before antibiotics — Yes	13 (93)	33 (92)	
Interval between CXR and antibiotics (Hours)			
< 2	3 (23)	6 (16)	0.80
2 – 4	6 (46)	21 (55)	
> 4	4 (31)	11 (29)	
CURB-65 Score			
0 – 1	2 (13)	27 (55)	< 0.01
2 – 3	9 (60)	19 (39)	
4 – 5	4 (27)	3 (6)	
Hours between admission and consultant review			
< 12	13 (87)	26 (54)	0.04
12	2 (13)	22 (46)	
Admission to critical care area — Yes	2 (14)	1 (3)	0.32
Route of Antibiotics			
Intravenous	14 (82)	45 (85)	1.00
Oral	3 (18)	8 (15)	
Comorbid Illness — Yes	17 (100)	34 (62)	< 0.01

majority of older patients (52.7%).we found that in – hospital mortality was associated with longer duration of hospital stay, older age, increased pneumonia severity, and presence of co-morbid illnesses. Older age is a major factor associated with increased mortality in CAP. In a study by Garcia – Vidal C et al,[4] older age (70 years) was associated with 2.7 times increased risk of in – hospital mortality in CAP. Similarly Marrie TJ et al found increased risk of mortality associated with older age.[1] This could be because of decreased immunity, increased susceptibility to infections and presence of co-morbid illnesses in older patients. Our study showed that 88% of patients who died in hospital were > 75 years of age. In view of this association, older patients require special care and management and CAP in this age group should never be taken lightly.

In our study severity of pneumonia as assessed by CURB – 65 score was associated with increased in – hospital mortality. In a large retrospective study by Garau J et al, severity of CAP was associated with early, late, and global mortality.[2] Moreover it was also

associated with prolonged hospitalization. Similarly many other studies have shown increased mortality associated with increased pneumonia severity.[1,4,8] Early mortality is usually associated with pneumonia related factors such as pneumonia severity while late mortality is affected more by factors related to patient management like choice of antibiotics. A study has shown that administering antibiotics according to recommended guidelines resulted in decreased mortality.[2] In another study on CAP, mortality was less in patients treated with levofloxacin or cefuroxime plus azithromycin as compared to other antibiotics.[1] So physicians should be mindful of CAP management guidelines as adherence to these guidelines has shown benefits in patient survival.

We showed that patients with any co-morbid illness like diabetes, hypertension, ischemic heart disease, chronic kidney disease, heart failure etc are at increased risk of in – hospital death. In fact 100% of our CAP patients who died in hospital had co-morbid illnesses. A recent study showed that co-morbid illnesses were the most important predictors of in – hospital mortality in CAP patients of age > 65 years.[9]

In addition to age, pneumonia severity, and co-morbid illnesses, many other factors have been shown to influence mortality in CAP. These include admission to ICU,[2,3] need for mechanical ventilation,[8] multilobar infiltrates,[2,4] septic shock with multiorgan failure,[4] and both hypocapnia and hypercapnia.[10]

Conclusion

Older age, increased pneumonia severity and co-morbid illnesses are associated with in – hospital mortality in community acquired pneumonia in adults. Focus should be on modifiable factors like adherence to recommended guidelines for the management of CAP.

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