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Survival After Hospitalization in Patients with Community Acquired Pneumonia: A Prospective Study.

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ABSTRACT

Background: Little is known as what happens to the patients who have survived an episode of community acquired pneumonia after they have been discharged from the hospital, especially in developing countries. Pneumonia being common illness in this part of world and paucity of studies on survival after discharge and predictors of mortality in community-acquired pneumonia (CAP) prompted us to undertake this study. AIMS: To study the survival and clinical predictors of mortality after hospitalisation in patients with community acquired pneumonia. **Methods:** A prospective cohort of patients presenting as community acquired pneumonia admitted in our institute (Sher-i-kashmir institute of medical sciences) was recruited from October 2008 to April 2010. **Results:** Our study comprised of 153 patients of community acquired pneumonia with median follow up of 397 days. Mean age of patients was 61.31±16.49 years. 99 (62.8%) were male and 54 patients were females. From total of 153 patients 34(22.22%) patients died at median follow up of 397 days Bivariate analysis showed a significant relation of increasing age with mortality (p value of 0.035). In addition to death increasing age was associated with re hospitalisation (p= 0.002) Absence of cough (p value=0.00) and absence of chest pain (p value=0.00), were significantly associated with death as outcome and also presence of altered sensorium was found to be associated with mortality(p value=0.02) The co morbid conditions which were significantly associated with death as outcome were diabetes mellitus (p=0.009), COPD (0.00), Cardiovascular Diseases (p value=0.00), Neurological diseases (p value=0.00). Tachypnea was significantly associated with mortality (p value=0.00) among complications CCF was significantly associated with mortality (p value=0.00). **Conclusion:** Our study showed that there is substantial mortality post discharge of around 20 % .Elderly patients (age > 60) presenting with altered sensorium and having comorbidities have increasing mortality post discharge and need to be closely followed post discharge.

Keywords: Community Acquired Pneumonia, Pneumonia.

INTRODUCTION

Pneumonia is an inflammation of pulmonary parenchyma resulting in exudative solidification (consolidation) of pulmonary tissue that may be infectious or non infectious in nature; however in medical parlance, pneumonia usually connotes the infection of pulmonary parenchyma.[1] Community acquired pneumonia is common and major cause of mortality and morbidity especially in developing world .Its incidence is 20 to 30% in developing world compared to 3-4% in developing world.[2] Community acquired pneumonia is diagnosed in approximately 4 million adults annually in the united states with more than 600,000 of them requiring hospitalization.[3] It has been observed that patients surviving an episode of community acquired pneumonia in intensive care units have greater mortality after discharge from hospital than age matched control subjects, possibly because of greater occurrence of co morbid illnesses.[4-14] Adult patients hospitalized with community-acquired pneumonia (CAP) have significantly shorter long-term survival than patients hospitalized for medical conditions other than CAP, according to data released at the European Respiratory Society 19th Annual Congress. Importantly, the shorter survival remained significant after controlling for age and multiple co morbidities. The shorter survival was seen even after discharge with a clinical "cure." A resolution of symptoms at 30 days has usually been regarded as evidence that the patient has survived CAP, but recent data have suggested that CAP may influence survival long after patients are considered clinically cured.[4,5,10-15] To decrease the immediate mortality due to CAP we already have safe empirical

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antibacterial regimes which have gone through the test of time, developing nations. Little is known as what happens to the patients who have survived an episode of community acquired pneumonia after they have been discharged from the hospital, especially in developing countries. Most of the studies on this subject have been done in developed countries, and since there are racial differences we don't know what happens to our patients of community acquired pneumonia after they are discharged from hospital. Are they really cured? Pneumonia being common illness in this part of world and paucity of studies on survival after discharge and predictors of mortality in CAP prompted us to undertake this study. We designed our study to study the survival of CAP patients, and to see what factors can lead to decrease in survival, So that we can formulate future follow up strategies and alter the natural history the disease.

Aims and Objectives

- To study the survival after hospitalisation in patients with community acquired pneumonia.
- To study the clinical predictors of mortality after hospitalisation in patients with community acquired pneumonia

MATERIALS AND METHODS

Study Design

A prospective cohort of patients admitted in our institute (Sher-i-kashmir institute of medical sciences) was recruited from October 2008 to April 2010.To increase the size of cohort some cases from chest disease hospital Srinagar were also taken. The Subjects were enrolled only after written informed consent. Patients were followed for mortality and morbidity closely by noting their home addresses, cell/telephone numbers. The subjects who changed their cell numbers were followed by their home visits.

Inclusion Criteria

All patients presenting with Community acquired pneumonia (CAP) were included in the study. CAP was defined as an acute illness (fewer than 14 days of symptoms), the presence of new chest infiltrates as confirmed by a radiologist or pulmonary critical care physician, and clinical features suggestive of acute pneumonia. The clinical features required were one of group A (fever>37.8C, hypothermia<36C, cough and sputum production) or two of B (dyspnea, pleuritic pain physical findings suggestive of lung consolidation and leukocyte count greater than 12000 or less than 4000).these criteria's are consistent with the published guidelines of community acquired pneumonia.[16]

Exclusion Criteria

(1) Patients with severe immunodeficiency as defined by the Centres for Disease Control Criteria for patients with acquired immune deficiency syndrome.[17]
(2) Patients receiving chemotherapy in the past 60 days.
(3) Patients receiving treatment with corticosteroids equivalent to prednisolone at more than 20 mg/day for more than 14 days.
(4) Patients receiving immunosuppression after organ transplantation.
(5) Patients receiving cyclosporine, cyclophosphamide, or azathioprine.
(6) Non ambulatory patients.
(7) Patients hospitalized within the past 30 days

All patients who died within 30 days of hospital discharge were excluded from the study. Mortalities after 30 days of hospital discharge were taken into account.

Data Collection

The variables of interest which were taken, were symptoms' and signs of pneumonia, comorbid conditions and results of tests as ordered by a treating physician such as blood glucose levels, blood urea, serum Creatinine, complete blood count, liver function tests, ECG, x ray chest, ultrasound abdomen, cultures as ordered by the treating physician were recorded Pneumonia severity index score was calculated as described by Fine and co-workers.[6]

Statitstical Calculations:

Statistical calculations were performed with spss 17 statistical package. Univariate analysis using chi square tests or Fisher exact tests were used when the variable of interest was categorical. Cox regression modeling was used for multivariate analysis with models using all significant interactions. All p values were taken as two tailed with value below 0.05 taken as significant. In addition pear sons correlation was used to determine correlation between various clinical and lab variables and also to find association by bivariate analysis. Kaplan Meier analysis was used to get survival curves.

All patients who died within 30 days of hospital discharge were excluded from the study. Mortalities after 30 days of hospital discharge were taken into account.

RESULTS

Our study comprised of 153 patients of community-acquired pneumonia, which were followed over maximum of two years (720 days), minimum of 3 months (90 days) with median follow up of 397 days. The mean age of patients was 61.31+-16.49 years. From the total number of patients 99 (62.8%) were males with mean age of 59.53+-18.21 years and 54 patients were females with mean age of 64.59+-12.24 years .We followed our patients over maximum of 720 days (2 years) with median follow up of 397 days. From total of 153 patients

34(22.22%) patients died at median follow up of 397 days .The various clinical variables in survivors and non-survivor groups is shown in [Table 1]. Cough was the commonest symptom in survivors (98.3%) as well as non-survivors (67.64%), chest pain was common in survivors (42.01%) than non-survivors (17.6%), altered sensorium was more common in non-survivors (55.8%) than survivors (10.08%). Absence of cough (p value=0.00) and absence of chest pain (p value=0.00) were significantly associated with death as outcome and also presence of altered sensorium was found to be associated with mortality (p value=0.02). Kaplan Meier graph [Figure 1] shows the decreased survival as the age increases with lowest survival in 61-80 years age group. There was significantly high mortality in the patients from all age groups with community acquired pneumonia compared to the general population with matched age and sex as shown in [Table 2] The various comorbidities in survivor and non survivors is shown in [Table 3]. The commonest co morbidity is hypertension in survivors (41%) as well as non-survivors (50%). The co morbid conditions which were significantly associated with death as outcome were diabetes mellitus (0.009), COPD (0.00), Cardiovascular Diseases (p value=0.00), Neurological diseases (p value=0.00). Comparison of vitals in survivor's vs non-survivors is shown in Table 4. Tachypnea was significantly associated with mortality (p value=0.00 by Fisher exact test). The complication profile in survivors vs non survivors is shown in [Table 5]. In survivors commonest complication was pleural effusion while commonest complication in non survivors was CCF and Pleural effusion, in these CCF was significantly associated with mortality (p value=0.00).

Table 1: Comparison of various clinical variables in survivor and non-survivor groups.

Clinical Variable	Survivor Group	Non Survivor Group	P value
Mean age (SD) years	59.5(17.1)	68.8(10.5)	.035
Female sex	41 (34.4%)	13 (38.2%)	0.59
Cough	117 (98.3%)	23 (67.64%)	0.00
Haemoptysis	17 (14.2%)	6 (17.6%)	0.67
Smoker	65 (54.6%)	21 (61.7%)	.260
Chest pain	50 (42.01%)	6 (17.6%)	0.009
Breathlessness	50 (42.01%)	16 (47.05%)	0.45
Altered sensorium	12 (10.08%)	19 (55.8%)	.020

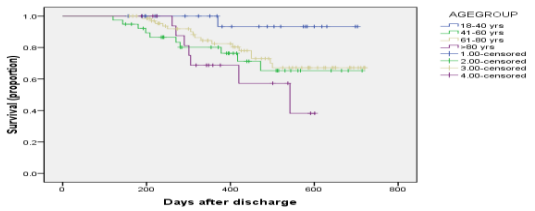

Figure 1: Survival by age group.

Kaplan Meier graph above shows the decreased survival as the age increases with lowest survival in 61-80 years age group.

Table 2: Observed and expected mortality in different age groups with community acquired pneumonia.

Age Group(years)	Observed Mortality	Expected* mortality	P Value
18-40	4.0%	0.2%	0.00
41-60	21.6%	0.7%	0.00
61-80	25.0%	4.5%	0.00
>80	36.8%	15.4%	0.02

*Expected mortality calculated from age and sex matched Indian population data (18)

Table 3: Comparison of co morbidities in survivor and non-survivor groups.

Clinical Variable	Survivor Group	Non Survivor Group	P value
Hypertension	41 (34.4%)	17 (50%)	.101
Diabetes mellitus	10 (8.4%)	7 (20.5%)	.009
COPD	20 (16.8%)	16 (47.05%)	.000
Cardiovascular Diseases	24 (20.1%)	24 (70.05%)	.000
Chronic liver disease	1 (0.8%)	1 (2.9%)	.345
Neurologic diseases	8 (6.7%)	15 (44.1%)	0.00
Chronic Kidney Disease	2 (1.6%)	1 (2.9%)	.643
Malignancy	0 (0%)	0 (0%)	.101

Table 4: Vitals in survivor and non-survivor groups.

Vital	Survivor Group		Non Survivor Group		P value
	Mean(SD)	Range	Mean (SD)	Range	
Respiratory Rate	24.7 (5.6)	16-36	29.3 (6.6)	18-44	0.00
Pulse Rate per minute	93.4 (17.3)	72-124	102.9 (16.2)	68-136	0.10
Temperature F0	98.9 (1.4)	97-103	99.38 (1.3)	96-102	0.49
Systolic BP Mmhg	114.5 (20.1)	70-160	104.3 (20.01)	70-150	0.06
Diastolic BP mmhg	72.08 (12.3)	50-100	66.76 (12.4)	50-90	0.059

Table 5: Complication profile of patients in survival and non-survivor group.

Complication	Frequency	Survivors (n=119)	Non survivors (n=34)	P value
Pleural Effusion	20 (13.7%)	14 (11.7%)	6 (17.6%)	0.59
Empyema	6 (3.9%)	4 (3.36%)	2 (5.8%)	0.87
Lung Abscess	2 (1.3%)	1 (0.8%)	1 (2.9%)	0.36
Shock	10 (6.5%)	6 (5.04%)	4 (11.7%)	0.06
PTE	3 (1.9%)	2 (1.6%)	1 (2.9%)	0.63
Stroke	1 (0.6%)	0 (0%)	1 (2.9%)	0.26
ACS	1 (0.6%)	1 (0.8%)	0 (0%)	0.47
CCF	12 (7.8%)	6 (5.04%)	6(17.6%)	0.00
ARF	7 (4.5%)	6 (5.04%)	1 (2.9%)	0.40
Total	74	46	28	

DISCUSSION

For the last two decades appreciable work has been done on the post hospital mortality and survival in

community acquired pneumonia,[3-5,15,16,19-21] but as far as developing nations are concerned the literature is scarce on this subject. After these patients are discharged little is known what happens to them in following years. We attempted to know all this through our study and found an appreciable mortality post discharge which needs to be considered so that we can follow these patients closely and treat their co morbidities to improve their survival. From total of 153 patients 34 patients died which makes 22.22% of mortality in a median follow up of 397 days. .There are some studies showing substantial mortality post discharge.[5,10] One study of 141 adult CAP patients of all age groups reported a 1-year post discharge mortality rate of 25% Hedlund et al found a 2.5-year post discharge mortality rate of 21% in 241 patients 18 years or older hospitalized with CAP.[5,10] A Finnish population-based study followed up 122 elderly patients who survived hospitalization for CAP for up to 9 years Mortality was 19% at 1 year,[22] 32% at 2 years, and 54% at 5 years, and the risk of death remained elevated for the entire follow-up period compared with other elderly inhabitants from the same region.

AGE: Bivariate analysis has shown a significant relation with a p value of 0.035. In addition to death increasing age is associated with re hospitalisation with a p value of 0.002.The Kaplan Meier plots show decreased survival as the age increases. Since the patients in older age groups are more likely to have underlying co morbid diseases, therefore there is increased mortality in elderly people. Some studies like one by Brancati etal. go against our study , likely in their study the patients in younger age group were having significant co morbidties but most of the studies to mention among them as done by Waterer etal.[4] and other investigators supports our finding,[10-14] that increasing age in CAP means increase in mortality.

Altered Mental Status

Altered mental status was found to be a strong predictor of post discharge mortality in community acquired pneumonia patients. Cox regression analysis shows altered sensorium to be related to mortality with a p value of 0.02, Relative Risk=2.97 and 95% CI of 1.192-7.487. The study by zalacain etal.[15] has found sensorium significantly associated with post discharge mortality, there are number other studies which support this finding and another one by Grant Waterer,[4] There are number of other studies but most of them have been done for in hospital mortality.[6,15] Confusion is more likely to occur in patients with more severe organ disease , especially more severe cerebrovascular disease, also altered mental state is an indicative of some neurodenerative process not recognised the time of admission.

Pleuritic Chest Pain and Cough

By univariate analysis we have found that absence of chest pain is significantly related to death with a p value of 0.009 (Fisher's exact test), Similar is the case with absence of cough(p valu =0.00 by Fisher's exact test) so in other words we can say that chest pain and cough acts as a protector against mortality in community acquired pneumonia. The perception of pain and cough reflex are very important for the early recognition of disease, once these patients are discharged there is high possibility that they will get repeated infections because the protective mechanisms are weak. Similar findings were recorded by Ortquist A etal.[8] And in Spanish study which is one of the largest published study on community acquired pneumonia in elderly.[15]

Co Morbidities

Cardiovascular diseases were found to be significantly associated with death and decreased survival, using Cox regression analysis p value was 0.019 with relative risk of 3.29 within 1.22-8.9 95% CI. Other co morbid diseases' were not found to be associated with death but using bivariate analysis we found that COPD is associated with post hospital mortality with a p value of .0001. COPD patients have more frequent hospitalisations (p value 0.04). Neurological diseases are also significantly associated with post hospital mortality in patients with community acquired pneumonia with p value of 0.0001.We have not found renal and hepatic diseases significantly associated with post discharge mortality, possibly because of low sample size. Now a good body of evidence is in favour that co morbidities like cardiovascular, COPD, neurological, renal, hepatic and malignancies are associated with CAP Mortality after hospital discharge.[4,5,15,16] We were not able to find relation between renal disease and hepatic disease with death because of low sample size, possibly because of small number of patients, none of our patient had malignancy. Our findings are consistent with Waterer etal. Excluding last three diseases as mentioned. Although there is increase in mortality with increase in age (>60 years) when we compared the mortality in each age group with the age and sex matched Indian population data,[18] there is substantially increased mortality in each age group with all (p values less than 0.01), this finding supports the observations by other investigators that in addition to increasing age there are other risk factors which can lead to increase in mortality like by waterer etal.[4] and Zalacain etal.[15]

CONCLUSION

Our study showed that there is substantial mortality post discharge of around 20 % Elderly patients (age > 60) presenting with altered sensorium and having comorbidities have increasing mortality post discharge and need to be closely followed post discharge.

REFERENCES

1. Robert D Brandstetter etal .The Pneumonias Springer Verlag Newyork 1993;25.48
2. R WHO (1999). Health situation in the south east asian region 1994-1997. Regional office for SEAR, NEW DELHI
3. Wunderink RG etal. Long term outcome in patients with community acquired pneumonia.CHEST 2003;124;1895
4. W.waterer etal. Medium term survival in hospitalised patients with community acquired pneumonia(American journal of respiratory and critical care medicine.Vol.169pp 910-914 (2004)
5. Brancati Fl etal. Is pneumonia the really old man's friend? Two years prognosis after community pneumonia. Lancet 1993;342:30-33
6. Fine MJ etal. A prediction rule to identify low risk patients with community acquired etal.neumonia.New England journal of medicine ed. 1997;336;243-250
7. Gowardmang etal. Severe community acquired pneumonia and one year analysis in tertiary referral intensive care unit;PUBMED 2000 may 2 ,13/13/1109;161-4
8. Feldman C. Pneumonia in elderly, clinical chest medicine1999;20:563-573.
9. Sims RV. Bacterial pneumonias in elderly Emergency medical clinic north America 1990; 8 :207-220.
10. Hedlund JU, Ortqvist AB, Kalin ME, Granath F. Factors of importance for the long term prognosis after hospital treated pneumonia. Department of Infectious Diseases, Karolinska Institute, Danderyd Hospital, Stockholm, Sweden.Thorax. 1993 Aug;48(8):777-8.
11. Woodhead MA, Macfarlane JT, McCracken JS, Laverick A, Pilkington R, Macrae AD. Prospective study of the aetiology and outcome of pneumonia in the community. Lancet. 1987;1:671-674.
12. LaCroix AZ, Lipson S, Miles T, White L. Prospective study of pneumonia hospitalizations and mortality of U.S. older people: the role of chronic conditions, health behaviors and nutritional status. Public Health Rep. 1989;104:350-369
13. Macfarlane JT, Finch RG, Ward MJ, Macrae AD. Hospital study of adult community-acquired pneumonia. Lancet. 1982;2:255-258.
14. Berntsson E, Blomberg J, Lagergård T, Trollfors B. Etiology of community-acquired pneumonia in patients requiring hospitalization. Eur J Clin Microbiol Infect Dis. 1985;4:268-272.
15. Community-acquired pneumonia in the elderly: Spanish multicentre study , ERJ February 1, 2003 vol. 21 no. 2 294-30(14)
16. Long-Term Survival after Hospitalization for Community-Acquired and Healthcare-Associated Pneumonia Respiration 2010;79:128-136 (DOI: 10.1159/000255764)
17. Eric Mortensen etal. Causes of death for patients with community acquired pneumonia. Archives of internal medicine Vol.162 No.9, may 13,
18. Family Welfare Statistics in India 2009(table A18, 18.1,18.2)
19. Long-Term Morbidity and Mortality After Hospitalization With Community-Acquired PneumoniaA Population-Based Cohort Study Medicine _ Volume 87, Number 6, November 2008 Lippincott Williams & Wilkins
20. Marston BJ 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. Archives of internal medicine, 1997, 157:1709–18
21. Long-Term Morbidity and Mortality After Hospitalization With Community-Acquired PneumoniaA Population-Based Cohort Study Jennie Johnstone, MD, Dean T. Eurich, PhD, Sumit R. Majumdar, MD, PhD, Yan Jin, MA,and Thomas J. Marrie, MD
22. Koivula I, Sten M, Makela PH. Prognosis after community-acquired pneumonia in the elderly: a population-based 12-year follow-up study. Arch Intern Med. 1999;159:1550-1555

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