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Original Research Article

Presentation and Severity of Community Acquired Pneumonia at Emergency Department of Tertiary Care Hospital – A Cross Sectional Study

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Abstract

Introduction: Pneumonia remains a major cause of death in developed countries. Pneumonia severity index (PSI), developed in the USA after pneumonia outcome research trial (PORT), and the BTS rule, which has recently been modified to the CURB-65 rule- "confusion, elevated blood urea nitrogen, elevated respiratory rate, low systolic or diastolic blood pressure (BP), and age over 65 years (CURB-65)" rule. The two scoring approaches are viewed as being complementary, as each has different strengths and weakness.

Objective: To compare severity of pneumonia cases with CURB -65 & PSI score criteria.

Material Methods: This was single centre cross sectional study conducted at emergency department of V.S. Hospital, Ahmedabad for 1 year from November 2015 to October 2016. 200 patients presenting to the emergency department of VS Hospital with breathlessness, at any time of the day, during the study period were included. Requirement for ICU admission was studied as a marker for "severe pneumonia".

Result: The load of pneumonia cases presenting to our ED is 12.4%. Mortality was high in patients who developed cyanosis (71.42%), in patients with SPO2<92%, in smoker group (17.50%) and in non-adverse habit group 9.17%. Means score of CURB-65 for E-WARD disposition of patient is 2.8182± 1.23, to MICU is 2.5102±-1.27 and to GENERAL WARD is 0.8729±0.88. Mean PSI score for disposition of patient to E-WARD is 130.48±33.95,MICU 120.81±35.05,GENERAL-WARD 78.97±31.14 (p value 0).

Conclusion: ED physician has an important role to play in management of such cases. Old age and male sex has higher incidence and higher morbidity and mortality attached to it. Patients with higher CURB-65 & PSI have higher chances of admission to ICU and higher mortality.

Keywords: Community Acquired Pneumonia (CAP), CURB-65, PSI

Introduction

Pneumonia remains a major cause of death in developed countries [1]. Despite being the cause of significant morbidity and mortality, pneumonia is often misdiagnosed, mistreated, and underestimated. For patients with classic complaints of fever and productive cough, the clinical diagnosis of pneumonia is straightforward, especially when accompanied by pulmonary infiltrate on plain chest radiographs. More challenging, however, is identifying pneumonia in patients who present with atypical complaints (e.g., abdominal pain). India has a huge burden of pneumonia cases presenting in ED [1,2]. Hence Indian ED physician should be well versed with the presentation and diagnosis. Once pneumonia is diagnosed, the priorities in the ED are to provide appropriate respiratory support, assess the severity of disease, initiate appropriate empiric antibiotic therapy based on the most likely pathogens (and dependent upon the hospital policy where available), and make decisions regarding disposition and the need for isolation. Issues for which emergency physicians may have different perspectives include the use of blood and sputum cultures, indications for hospital admission, appropriate level of care, and the breadth of antimicrobial spectrum for empiric therapy. It is hoped that the knowledge of relevant prognostic factors might be useful for early identification of patients at high risk requiring intensive care treatment. This also helps in appropriate antibiotics, fluids, ventilator support and disposition. Prognostic scoring systems for CAP have been developed to address these issues. The two prominent tools for this purpose are the pneumonia severity index (PSI), developed in the USA after pneumonia outcome research trial (PORT), and the BTS rule, which has recently been modified to the CURB-65 rule- "confusion, elevated blood urea nitrogen, elevated respiratory rate, low systolic or diastolic blood pressure (BP), and age over 65 years (CURB-65)" rule [3,4]. The two scoring approaches are viewed as being complementary, as each has different strengths and weakness. Hence, it's our intention to study these two scoring system in our Emergency Department and how it can be helpful for ED physicians.

Material and Methods

This was single centre cross sectional study conducted at emergency department of V.S. Hospital, Ahmedabad for 1 year from November 2015 to October 2016. 200 patients presenting to the emergency department of VS Hospital with breathlessness, at any time of the day ,during the study period were included. Chest radiograph (postero-anterior and lateral views(only when strictly required)) at presentation and repeated after 48 hours; electrocardiogram; arterial blood gas analysis and serum electrolyte measurement; sputum for gram staining and culture; blood cultures (in selected patients); complete blood counts, blood urea nitrogen and serum creatinine; fasting blood glucose, serum bilirubin, aspartate aminotransferase(AST),alanine aminotransferase(ALT),alkaline phosphatase (ALP), PSI scoring and CURB-65 scoring on the basis of the points. Other investigations like pleural fluid analysis, computed tomography (CT) of the chest, broncho- alveolar lavage (BAL) were done depending on the clinical scenario of the patient. Patient presented with signs/symptoms suggestive of LRTI supported with or without laboratory investigations and radiologically proven LRTI (when available) patients were included in study. Patients under age of 15 yrs, Chronically immunosuppressed patients (defined as immunosuppression for solid organ transplantation, post-splenectomy, receiving >10mg/day of prednisone or the

equivalent for more than 30 days, treatment other immunosuppressive agents, neutropenic patients with absolute neutrophil count <1000/mm3); Pneumonia other than CAP, Patients with an alternate diagnosis during follow-up, Patient requiring isolation were excluded from study. At the clinical end points (hospital discharge or death) the parameters like Need of admission to ICU, Need for mechanical ventilation and Condition at 30 days after discharge from the hospital (mortality or hospital discharge) were recorded. in-hospital death or death within 30 days of discharge was the main outcome studied. Requirement for ICU admission was studied as a marker for "severe pneumonia". Data was entered in Microsoft excel worksheet and was analysed using Epi Info software. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for different PSI and CURB-65 grades with qualitative variables (death, ICU admissions) as an outcome.

Results

There was 124 (62%) males and 76 (38%) were female. In our study, in female patients 7.89% expired, 92.11% survived. In male patients 15.32% expired, 84.68% survived. Most common presentation of patient in our study was Breathlessness (73.50%), Cough (16%), Chest pain (6.5%), altered sensorium (3.5%).

Table 1: Gender and Outcome

Gender	Expired	Survived
Female	6(24%)	70(40%)
Male	19(76%)	105(60%)
Total	25(100%)	175(100%)
Chi Square=1.746,df=1, p=0.1863		

Highest mortality in patients of pneumonia presented with altered sensorium (71.43%), then with breathlessness (13.61%). Total 7 patients develops cyanosis out of them 5 were expired, and 2 were survived. Mortality was high in patients who developed cyanosis (71.42%).

In our study 81 patients having SPO_2 <92%, out of them 24 were expired, 57 survived & 119 patients had SPO_2 >92% out of them only 1 was expired & 118 were survived. Mortality was high in patients had SPO_2 <92%. Mortality high in patient having past history of pneumonia (48%), Pulmonary T.B + pneumonia (28%), 24% have no past history.

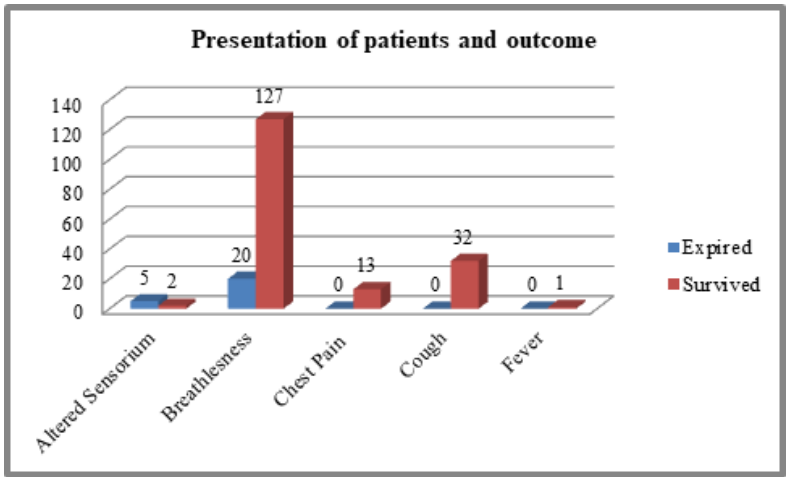

Figure 1: Presentation of patients and outcome

Table 2: Clinical Findings and Outcome

Clinical Finding	Expired	Survived
Spo2		
<92%	24(29.63%)	57(70.37%)
>92%	1(0.84%)	118(99.16%)
Cyanosis		
No	20(10.36%)	173(89.64%)
Yes	5(71.43%)	2(28.57%)
Smoking		
No	11(9.17%)	109(90.83%)
Yes	14(17.5%)	66(82.5%)

Total number of patients were 200. Among them 25(12.5%) expired and 175(87.5%) survived. About 33 patients shifted to E-WARD & 49 to MICU, 118 to General ward, among them 25 expired Highest mortality in patients admitted ICU [E-WARD & MICU (30%)] patients. In our study, Highest mortality occur in patients who were put on mechanical ventilator (92%) then BIPAP (8%) Mean pCO2 for ventilator patient is 53.18±23.70 mm of Hg; BIPAP 43.82±16.34 mm of Hg. Table 4 and Table 5 showing disposition of patients according CURB-65 and PSI Score.

Table 3: Patients disposition according to CURB 65

CURB-65	E-WARD	GENERAL WARD	MICU	TOTAL
0	0(0%)	48(94.12%)	3(5.88%)	51(100%)
1	6(10.71%)	42(75%)	8(14.28%)	56(100%)
2	7(16.28%)	24(55.81%)	12(27.91%)	43(100%)
3	10(34.48%)	3(10.34%)	16(55.17%)	29(100%)
4	7(46.67%)	1(6.66%)	7(46.67%)	15(100%)
5	3(50%)	0(0%)	3(50%)	6(100%)
Total	33(16.5%)	118(59%)	49(24.5%)	200(100%)

Table 4: Patients disposition according to PSI (class)

CURB-65	E-WARD	GENERAL WARD	MICU	TOTAL
0	0(0%)	25(52.59%)	2(7.41%)	27(100%)
1	2(6.25%)	28(87.5%)	2((6.25%)	32(100%)
2	3(9.09%)	25(75.76%)	5(15.15%)	33(100%)
3	13(20.31%)	31(48.44%)	20(31.25%)	64(100%)
4	15(34.09%)	9(20.45%)	20(45.45%)	44(100%)
Total	33(16.5%)	118(59%)	49(24.5%)	200(100%)

Highest frequency of complication is Septicemia (21.50%), Septic shock (MODS) (16.5%), type 2 respiratory failure (8.50%), Left ventricular failure (5%), Highest mortality in patients having septic shock +septic acute kidney injury (84%), then septic shock (16%).

Discussion

The load of pneumonia cases presenting to our ED is 12.4%. This is really a huge number. This shows there is quite a lot burden of CAP on the society and ED physician will come across such cases very frequently. He has to be well versed with the management of such cases. In our study, in female patients 7.89% expired, 92.11% survived. In male patients 15.32% expired, 84.68% survived. Male to female

ratio is comparable in other studies [5]. This is probably because male are having more adverse habits, out of home activities etc. Mortality also high in male patient-comparable with other studies [5,6,7]. This may be again due to more smoking, tobacco habits. COPD (34%), past history of Pulmonary Tuberculosis (13%), IHD (10%), Bronchial Asthma (4.5%), Diabetes (8%), Hypertension (5.5%). Mortality is highest in COPD patient (32%), followed by patient with Past history of Tuberculosis (16%) However, 28% have no co-morbidity. COPD is one of the leading causes of breathlessness in India. This is due to high smoking, tobacco etc. this has high burden on society. It also leads to more chances of pneumonia and mortality because of that. This co morbid conditions are comparable with other studies. [8,9] Second co-morbid condition associated with high mortality is past history of Pulmonary T.B and IHD. In western literature, IHD and LVF patients with pneumonia has higher morbidity and mortality, as also very apparent in this study[9]. Highest mortality in patients of pneumonia presented with altered sensorium (71.43%), then with breathlessness (13.61%) and this is comparable with other studies [10] Therefore, ED physician should always have suspicion of pneumonia in ED presented with altered sensorium and infectious disease setting and should have aggressive management and disposition strategies. All hallmarks of pneumonia. However, in our study only 12.50% of patients had bronchial breathing and 21% had coarse crepitation. This may be because of busy, noisy ED environment and expedite condition in ED .comparable with other studies. [11] However, percussion, TVF and VR are not at all reliable in ED. In our study 7 patients develops cyanosis out of them 5 were expired, & 2 were survived. Mortality was high in patients who developed cyanosis (71.42%). In our study 81 patients having SPO_2 <92%,out of them 24 were expired, 57 survived and 119 patents had SPO_2 >92% out of them only 1 was expired & 118 were survived. Mortality was high in patients had SPO_2 <92%. Mortality high in smoker group (17.50%) then non-smoker (9.17%). [12] Mortality in non-adverse habit group 9.17%. Mortality high in patient having past history of pneumonia (48%), Pulmonary T.B +pneumonia (28%), 24% have no past history. Total number of patients in our study n=200. Among them 25(12.5%) expired and 175(87.5%) survived. Low mortality of 5.7% &Higher mortality (ranging from 21-25%) comparable with other studies. [13–17] 33 patients shifted to E-WARD & 49 to MICU, 118 to General ward, among them 25 expired Highest mortality in patients admitted ICU [E-WARD & MICU (30%)] patients comparable with other studies. [18,19,20] In our study, Highest mortality occur in patients who were put on mechanical ventilator (92%) then BIPAP (8%) Mean pCO2 for ventilator patient is 53.18±23.70 mm Hg; BIPAP 43.82±16.34 mmHg. This shows that higher pCO2 patients require invasive mechanical ventilator support. Obviously patients requiring invasive ventilator support carries higher mortality. Highest frequency of complication is Septicemia (21.50%), Septic shock (MODS) (16.5%), type 2 respiratory failure (8.50%), Left ventricular failure (5%), Highest mortality in patients having septic shock +septic acute kidney injury (84%), then septic shock (16%) Hence, initial fluid challenge and appropriate antibiotics should be aggressive to prevent the patient going in Septic AKI. Generally cases presented with CURB-65 of 0 to 1 feature receive outpatient care, patients with two features be admitted (Low risk), and ICU level care be considered for patients with three or more factors (High risk), and patients presented with PSI, Hospitalization is recommended for patients with a score more than 91 (class IV-V), and brief admission or observation may be considered for patients with a score of 71

to 90 (class III). However, here all these cases, with low CURB-65 and low PSI score are admitted. This is because the patient's pattern and class presented to this setting are such that they are pressing on for admission. Means score of CURB-65 for E-WARD disposition of patient is 2.8182±1.23, to MICU is 2.5102±1.27 and to GENERAL WARD is 0.8729±0.88 (p value - 0.0021) This shows higher the CURB-65, more chances of patient disposition into MICU, E-WARD. Mean CURB 65 for expired patient is 3.96±0.7348, survived 1.257±1.06 (p value 0.0292). In CURB -65 class 5 highest mortality (100%), class 4 (80%) class 3 (24.14%), class 2,1,0 (0%) This shows, higher mortality with higher CURB-65, and this is statistically significant (p value-0.00). Mean PSI score for disposition of patient to E-WARD is 130.48±33.95, MICU 120.81±35.05, General-ward 78.97±31.14 (p value 0) This shows higher the PSI SCORE, more chances of patient disposition into MICU, E-WARD. Mean PSI (SCORE) for expired patient 151.8±21.44; survived 90±35.38 (p value 0.0044) In PSI class 5 have 47.73%, class 4-6.25% & other class have 0% mortality. (p value -0.00) The mortality risk & the need for ICU admission are higher as the scores increased in both PSI & CURB-65-comparable with other studies. [21,22,23]

Conclusion

Burden of pneumonia cases in our ED is 12.4%, that clearly states that ED physician has an important role to play in management of such cases. All age group and both sex has higher chances of acquiring this disease. However, old age and male sex has higher incidence and higher morbidity and mortality attached to it. Patients with higher CURB-65 & PSI has higher chances of admission to ICU and higher mortality. Hence good liaison is required between ED physician and ICU staff. CURB-65 has good correlation with ICU admission, morbidity and mortality.

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