

Comparison of PSI Scoring System with CURB-65 as an Marker of Sevearity in Comminity Acquired Pneumonia

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Abstract

Introduction: Pneumonia is a commonly seen ailment in the department of general medicine and chest medicine. However with timely diagnosis and appropriate management the duration of morbidity and mortality rate can be reduced. Various grading systems are utilized to predict the mortality rate of pneumonia. **Objective:** We aimed at analysing the utility of PSI score and CURB-65 in predicting the 30 day mortality rate in patients with community acquired pneumonia at our institute. **Materials and methods:** A retrospective study was conducted at our institution in which the records of the patients who presented to the department of Chest and emergency medicine between January 2017 to December 2017 and diagnosed as community acquired pneumonia were retrieved reviewed. Clinical examination findings, radiological findings and the laboratory findings were recorded in the patient's proforma. The PSI score and CURB-65 score were calculated and correlated with the patient's clinical outcome. **Results:** 175 patients were diagnosed as community acquired pneumonia (CAP) cases. Among them 85 patients were treated on OPD basis. The rest 90 patients were hospitalised for treatment. 22 patients were admitted to wards, and 68 patients were admitted to ICU. Of the total 90 hospitalised patients 27 patients were females and 63 patients were males. The patients were between 20 years to 70 years. Highest numbers of patients were seen in the age group of 50-59 years. The clinical outcome was defined as mortality among the hospitalised patients. The mortality rate in our study was 30% (27 patients). Considering class I, II, III of PSI score as low risk group and score 0 to 2 of CURB-65 as low risk group the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy were calculated. The sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of PSI Score were 85%, 65%, 35%, 84% and 50% respectively. In comparison the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of CURB-65 were 27%, 71%, 60%, 100% and 80% respectively. **Conclusion:** We conclude from our study that PSI score is more sensitive than CURB-65 in warranting the ICU admissions whereas CURB-65 is more specific in predicting 30 day mortality risk among the patients. The diagnostic accuracy of CURB-65 was higher in our study.

Keywords: PSI Score; CURB-65; Mortality Rate; Sensitivity; Specificity; Diagnostic Accuracy.

Introduction

Pneumonia is a commonly seen ailment in the department of general medicine and chest medicine. It is a significant cause of morbidity and mortality throughout the world particularly among patients

above 65 years of age [1,2,3]. In a developing country like India it is one of the commonest infections resulting in considerable morbidity and mortality amongst the elderly individuals [4]. However, with timely diagnosis and apt management the duration of morbidity and mortality rate can be reduced.

Various grading systems are utilized to predict the 30-day mortality rate of pneumonia. The most commonly used ones are PSI (pneumonia severity index) and CURB-65, CRB-65, Expanded CURB-65. Several studies are conducted to access the utility of these scoring systems in predicting the morbidity and mortality rate, the rate of admissions to hospitals and intensive care units and have divergent conclusions.

Objectives

We aimed at analysing the utility of PSI score and CURB-65 in predicting the 30 day mortality rate in patients with community acquired pneumonia at our institute.

Materials and Methods

Retrospective study was conducted at our institution, after obtaining the ethical committee approval. The records of the patients who presented to the department of chest medicine and emergency medicine with the diagnosis of community acquired pneumonia between January 2017 to December 2017 were retrieved and reviewed. These patients had been treated as per the clinical discretion of the treating physician. The PSI score and CURB-65 score were calculated and correlated with the patient's clinical outcome. Only adult patients were included in the study. The retroviral positive patients and paediatric patients were excluded from the study. Clinical examination findings, radiological findings and the laboratory findings were recorded in the patient's proforma. The data were analysed for the descriptive statistics and the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of both PSI score and CURB-65 were calculated.

Results

During the study period 175 patients were diagnosed as CAP cases. Among them 85 patients were treated on OPD basis. The rest 90 patients were hospitalised for treatment. 22 patients were admitted to wards, and 68 patients were admitted to ICU. Of the total 90 hospitalised patients 27 patients were females and 63 patients were males. The patients were between 20 years to 70 years. Highest number of patients were seen in the age group of 50-59 years. The age distribution seen is as shown in the Figure 1. The co-morbid conditions like diabetics, renal disease, cardio vascular diseases, cerebro vascular accidents etc., were seen among 77 patients, with few of the patients having more than one co-morbid condition. The distributions of co-morbid conditions among both ward and ICU patients are as shown in Table 1. The clinical outcome was defined as mortality among the hospitalised patients. The mortality rate in our study was 30% (27 patients). The correlation of clinical outcome among the hospitalised patients with PSI score and CURB-65 score in different age group is as shown in table 2. Considering class I, II, III of PSI score as low risk group and score 0 to 2 of CURB-65 as low risk group the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy were calculated. The sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of PSI Score were 85%, 65%, 35%, 84% and 50% respectively. In comparison the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of CURB-65 were 27%, 71%, 60%, 100% and 80% respectively. The comparison of the both the scoring systems are as shown in Figure 2.

Table 1: Table showing distributions of co-morbid conditions among both ward and ICU patients.

| | Previously healthy | Diabetics | Cardio vascular disease | Cerebro vascular accidents | Liver disease | Diabetics and renal disease | Renal disease | Cardiovascular and renal disease | Total |
|---------------|--------------------|-----------|-------------------------|----------------------------|---------------|-----------------------------|---------------|----------------------------------|-------|
| Ward patients | 11 | 02 | 03 | - | 03 | - | 03 | - | 22 |
| ICU patients | 02 | 22 | 11 | 01 | 04 | 12 | 09 | 09 | 68 |
| Total | 13(14.4%) | 22(24.4%) | 14(15.5%) | 01(1.1%) | 07(7.7%) | 12(13.3%) | 12(13.3%) | 09(10%) | 90 |

Table 2: Table showing correlation of clinical outcome among the patients of different age group with PSI score and CURB-65 score.

| Age group | 20-29 | 30-39 | 40-49 | | 50-59 | | 60-70 | | | |
|------------------|-------|------------|------------|---------------|-------------|--------------|-------------|-------------|------------|------------|
| No of cases | 02 | 05 | 21 | | 56 | | 06 | | | |
| 30-day mortality | 0 | 1 | 5 | | 09 | | 06 | | | |
| PSI Score | II | II | II(5cases) | III(14 cases) | IV(2 cases) | IV(35 cases) | V(21 cases) | V(6 cases) | | |
| CURB-65 | 2 | 2(4 cases) | 3(1 case) | 2(10cases) | 3(11cases) | 3(12cases) | 2(29 cases) | 4(15 cases) | 3(2 cases) | 4(4 cases) |

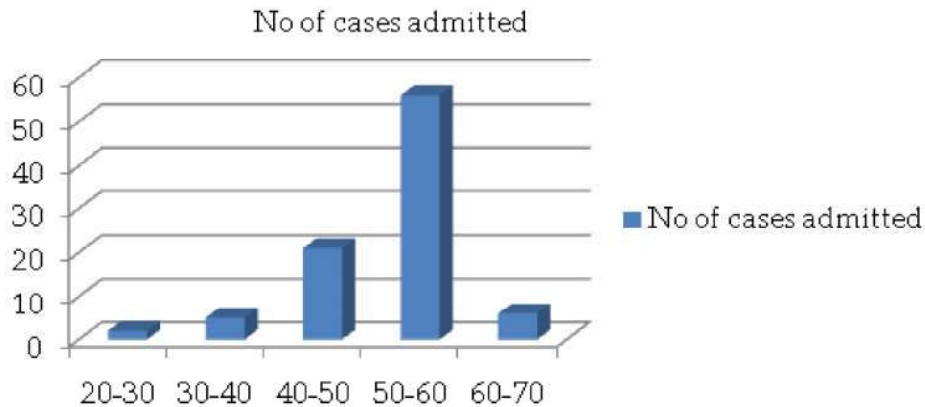


Fig. 1: Figure showing age distribution of the patients.

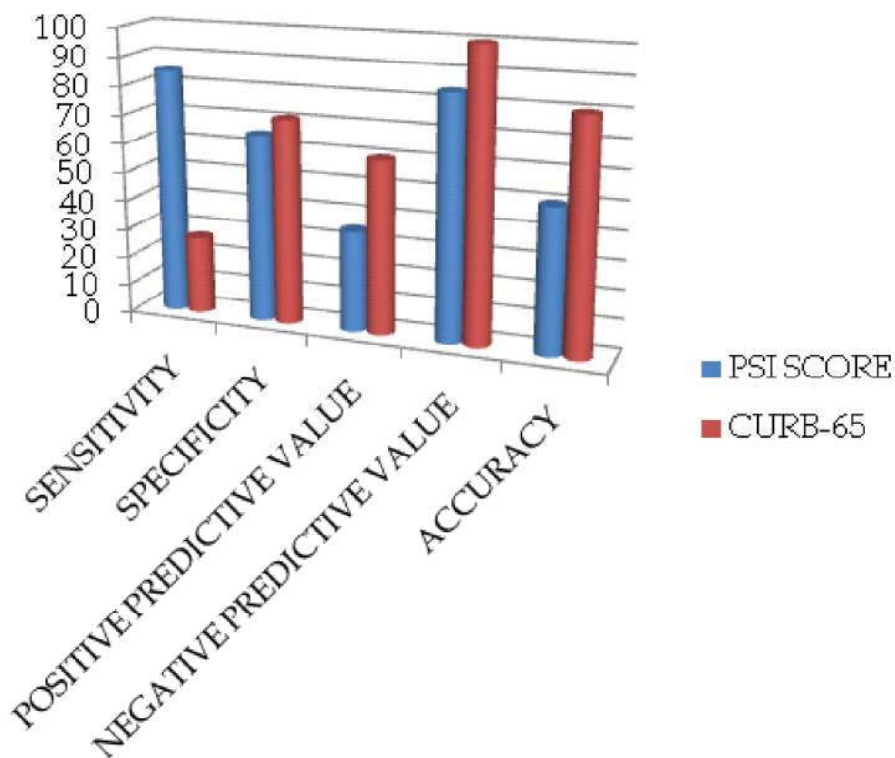


Fig. 2: Figure showing comparison of statistical data of both PSI score and CURB-65

Discussion

Pneumonia is one of the commonest communicable diseases diagnosed in the developing country like India. Accurate assessment of the clinical condition of the patient helps the treating physician to decide the management protocol and assess the need for ICU care and ventilator support. It also helps in predicting the risk of mortality amongst the patients. Of the several predictive

scoring systems used world-wide PSI Score and CURB-65 are most commonly used. In our study males were more commonly affected than females. In our study 48.5% of patients with the clinical diagnosis of CAP required hospitalisation. The presence of co-morbid conditions significantly affects the clinical outcome of the patients. In our study co-morbid conditions were seen in 85.5% of the hospitalised patients. More ICU admissions and mortality were seen with increasing age

groups [5]. Diabetes mellitus was the most common co-morbid condition seen in 37.7% of our study group. Mortality rate of 30% were seen among the hospitalised patients in our study. The mortality rate depends on the age group of the patients and the associated co-morbid conditions. The meta-analysis by MJ Fine et al. showed that mortality rate significantly increased from 5% in patients treated on OPD basis to more than 30% in ICU patients [6]. The sensitivity of PSI scoring system was higher than the CURB-65 scoring systems in our study. Similar results were shown by GC Mbata et al. study [7]. This helps in segregation of the patients requiring ICU admission. The CURB-65 scoring system appears to be much simple than PSI score thus can be easily implemented in predicting the need for ICU admission. On the other hand the PSI Scoring system appears complicated with many clinical and laboratory parameters. As the presence of multiple co-morbid conditions are taken into consideration in PSI score which is also the common scenario in any ICU setting it appears to be a better parameter for mortality prediction than CURB-65 which doesn't take consideration of this factor [8]. The higher specificity rate was seen in CURB-65 than PSI Score. This finding was similar to various other studied [7,9,10]. In our study CURB-65 showed a better diagnostic accuracy.

Conclusion

We conclude from our study that PSI score is more sensitive than CURB-65 in warranting the ICU admissions whereas CURB-65 is more specific in predicting 30 day mortality risk among the patients. The diagnostic accuracy was higher in CURB-65 in our study.

Conflict of Interest: Nil

Financial Support: Nil

References

1. Colice GL, Morley MA, Asche C, Birnbaum HG. Treatment costs of community-acquired pneumonia in an employed population. *Chest*. 2004;125:2140-5.
2. Mandell LA, Wunderink RG, Anzueto A, Bartlett JG, Campbell GD, Dean NC, et al. Infectious diseases society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. *Clin Infect Dis*. 2007;44:S27-72.
3. Brar NK, Niederman MS. Management of community-acquired pneumonia: A review and update. *Ther Adv Respir Dis*. 2011;5:61-78.
4. Prashasti Prasad and Sevitha Bhat. Clinico microbiological study of community-acquired pneumonia. *Lung India*. 2017;34:491-92.
5. Safwat A. M. Eldaboosy, Khalid M. Halima, Ahmad T. Shaarawy, HatemM. Kanany et al. Comparison between CURB-65, PSI, and SIFF scores as predictors of ICU admission and mortality in community-acquired pneumonia. *The Egyptian Journal of Critical Care Medicine*. 2015;3:37-44.
6. Fine MJ, Smith MA, Carson CA, et al. Prognosis and outcomes of patients with community-acquired pneumonia. A meta-analysis. *JAMA* 1996; 275:134-41.
7. G.C. Mbata, C.J. Chukwuka, C.C. Onyedum, B.J.C. Onwubere, E.N. Aguwa. Comparison of two predictive rules for assessing severity of community acquired pneumonia. *Afr J RespirMed*. 2014;10:10-14.
8. MS Neiderman. Making sense of scoring systems in community acquired pneumonia. *Respirol* 2009;14:327-35.
9. Madhu S et al. Comparative study of CURB-65, Pneumonia Severity Index and IDSA/ATS scoring systems in community acquired pneumonia in an Indian tertiary care setting. *Int J Adv Med*. 2017;4:693-700.
10. Mostafa Alavi Moghaddam et al. Pneumonia sevearity index in comparison to CURB-65 in predicting the outcome of community acquired pneumonia among the patients referred to an Iranian emergency department: a prospective survey. *Brazi infect dis* 2013;7:179-83.