Journal of Cardiovascular Disease Research
ISSN:0975-3583,0976-2833 VOL14,ISSUE03,2023

ORIGINAL RESEARCH

Comparison of pneumonia severity scores for patients diagnosed with pneumonia in emergency department

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Received: 14 February, 2023 Accepted: 19 March, 2023

Abstract
Background: One of the leading causes of patient mortality, despite modern treatment options, is sepsis brought on by pneumonia or pneumonia itself. In pneumonia, the best predictive technique is still up for debate. This study aimed to compare severity ratings for pneumonia and examine the viability of using new scores for evaluating patients who presented to the ER with a diagnosis of pneumonia.
Methods: Patients diagnosed with pneumonia in the emergency room had their demographic information, laboratory and imaging results, agitation, elevated blood urea nitrogen, respiratory rate, and blood pressure, pneumonia severity file (PSI), public early admonition score (NEWS), NEWS-lactate (NEWS-L) scores, hospitalization, referral, release, and 30-day mortality recorded."
Results: There were a total of 100 patients in the research. NEWS-L was shown to be the best accurate score for predicting mortality. Then came NEWS, CURB-65, and PSI in that order. The NEWS-L and NEWS scores were the most reliable in predicting ICU admission. After that, we saw the CURB-65 and PSI scores. The NEWS-L score proved more accurate than its predecessors, the NEWS, the CURB-65, and the PSI, when it came to forecasting the likelihood of hospitalization. There were statistically significant differences in every measure of pneumonia severity between those who died and those who made it to day 30. The service and quality of life ratings of ICU patients were much higher than those of non-ICU patients.
Conclusions: Death, intensive care unit (ICU) admission, and other adverse outcomes were best predicted by the NEWS-L score.and hospitalization need. Patients with pneumonia in the ED may be stratified according to their mortality, hospitalization, and critical care needs using either the NEWS-L or NEWS score.
Key words: Emergency department, hospitalization, mortality, severity scores, pneumonia.

Introduction

Inflammation of the air sacs in the lungs is a symptom of pneumonia, an infectious illness. The problem of patients re-visiting the ED with the same or exacerbated symptoms is a constant challenge for emergency medicine specialists. From the perspective of the healthcare system as a whole, the issue of patients returning to the ED for retreatment is crucial since it increases both ED congestion and healthcare costs [1,2].All people with pneumonia do not need to be hospitalized [3], thus prognostic techniques are used to decide whether patients with CAP should be treated as outpatients or inpatients in addition to effective care of this illness.
The Pneumonia Severity Index (PSI) and the CURB-65 (confusability, increased blood urea nitrogen, respiratory rate, and blood pressure, plus age 65) are the most common severity measurements utilized. Consciousness, blood urea, systolic blood pressure, respiration rate, and age are all factors included in the CURB-65 [4] assessment. PSI has been demonstrated to be a more reliable predictor of short-term mortality than CURB-65 in studies comparing the two. PSI, on the other hand, is more complicated to compute than CURB-65 because of its unique set of variables [5]. The purpose of this research was to evaluate the efficacy of new pneumonia severity ratings and to compare existing scores using data from patients diagnosed with pneumonia at the emergency department.

Method

Once a local ethics committee granted its OK to the investigation, written informed permission was given by all participants. Community-acquired pneumonia was studied in all adult patients who had just been diagnosed with the disease. All patients were considered to have laboratory evidence of at least two of the symptoms characteristic with pneumonia (cough, sputum production, difficulty breathing, and pleuritic chest pain). Patients with pulmonary oedema, pulmonary thromboembolism, pulmonary edema, pulmonary TB, and hospital-acquired

pneumonia were not included. One hundred fifty individuals with pneumonia were included in the trial. One hundred people who were eligible were selected. Patients were documented according to their vitals, biochemistry, complete haemogram, arterial blood gas values, chest X-ray results, comorbid conditions, level of awareness, age, gender, and therapy. Patients' CURB-65, PSI, NEWS, and NEWS-L scores were determined. The factors used to determine the scores were collected at the patients' regular checkups. Depending on their severity, Patients diagnosed with pneumonia in the emergency room were discharged or transferred to a normal hospital ward. Without respect to their risk assessment, all patients in this study were monitored and given treatment.
Risk-scoring variables were labeled with a two-tailed P value of 0.05 or less, and 95% confidence intervals (CIs) were calculated. The Spearman test was performed to examine the relationship between the two sets of normally distributed data.

Result
Patients admitted to the intensive care unit had significantly lower pneumonia severity ratings than those admitted to the ward (non-ICU). Those who were admitted to the hospital vs those who were discharged after being diagnosed with pneumonia also differed significantly. (Table 1)

Table 1: Distribution of scores

Scores	Dead(n=20)	Survived(n=80)	*P*	ICU admission (n=55)	Non-ICU admission(n=45)	*P*	Hospitalized (n=60)	Non-hospitalized(n=40)	*P*
CURB-65 (mean±SD)	2.45±0.54	1.48±0.15	0.001	2.52±0.50	1.46±0.32	0.001	2.46±0.84	1.65±0.53	0.001
PSI(mean±SD)	128.12±15.05	120.15±24.06	0.001	119.10±20.14	123.25±20.09	0.12	124.80±22.22	110.69±23.12	0.001
NEWS(mean±SD)	9.45±2.30	4.26±2.60	0.001	6.53±1.59	3.16±2.09	0.001	5.17±2.05	4.10±2.01	0.001
NEWS-L(mean±SD)	12.05±2.14	6.05±2.20	0.001	10.01±2.80	6.35±2.11	0.001	7.14±3.15	6.71±2.12	0.001

In predicting 30-day mortality, hospitalization, and intensive care unit admission, the NEWS-L score excels since it incorporates lactic acid. (Table 2,3 and 4).

Table 2: Evaluation of pneumonia severity ratings for prognosis of 30-day mortality

Scores	SE	95% Cl	*P*
CURB-65	0.025	0.729-0.842	0.001
NEWS	0.020	0.789-0.868	0.001
NEWS-L	0.011	0.825-0.885	0.001
PSI	0.048	0.655-0.771	0.001

Table 3: Scoring the severity of hospitalized pneumonia infections

Scores	SE	95% Cl	*P*
CURB-65	0.026	0.545-0.645	0.001
NEWS	0.030	0.658-0.768	0.001
NEWS-L	0.031	0.689-0.798	0.001
PSI	0.038	0.540-0.652	0.001

Table 4: Evaluation of Needs Scoring System

Scores	SE	95% Cl	*P*
CURB-65	0.021	0.689-0.798	0.001
NEWS	0.019	0.816-0.906	0.001
NEWS-L	0.020	0.859-0.779	0.001
PSI	0.035	0.589-0.689	0.001

Discussion
Consistent with our findings, Jo et al. [6] observed that the NEWS-L score ranked first and the NEWS score ranked second. Both CURB-65 and PSI had fair performances, with PSI having a higher AUC. However, our

research showed that the PSI score was not even a moderate predictor of survival. Patients with a history of neoplastic illness and hepatic disease had a high PSI score.According to research by Chen et al. [7], the CURB-65 score is not a reliable predictor of death on its own. Patients with PSI ratings of 1 and 2 had a 2.4% death rate, according to a research by Gwak et al. [8]. We found statistically significant differences between individuals who survived 30 days after pneumonia diagnosis and those who did not. News (including NEWS-L and CURB-65) and PSI scores of the deceased were significantly different from those of the surviving, according to a study by Jo et al.4. Gwak et al. [8] likewise discovered a statistically significant difference between the PSI scores of the dead and those of the living. All of our findings lined up with those other investigations.
In terms of requiring intensive care unit admission due to pneumonia, the ROC analysis placed the NEWS and NEWS-L scores at the top. Using ROC analysis, Chen et al. [7] determined that the combination of lactate and CURB-65 score was superior than CURB-65 score alone in predicting the need for intensive care. Studies in individuals with pneumonia have shown a considerable difference in lactate levels between the dead and the living [9].

These studies together show that lactate level is a strong predictor of survival in individuals with pneumonia. The NEWS-L score outperforms other scores in predicting 30-day mortality, hospitalization, and intensive care unit admission because it contains lactic acid. There was a statistically significant difference between the severity evaluations of pneumonia among hospitalized patients and those among patients who got medical treatment at home. These results jived with those found in the CURB-65 investigation by Chen et al. [7].
Numerous research and international standards have shown that the PSI and CURB-65 are useful for determining the severity of CAP [10,11].Other considerations, such as the need for further examinations, social support, and comorbidities, need the input of clinical judgment to the decision-making process. Additionally, low-risk individuals are often hospitalized for treatment.
Due to the constraints of our investigation, the accuracy of NEWS may change when taking into account several measurements taken at various times.

Conclusion

According to our findings, the NEWS-L score is the best predictor of mortality, as well as ICU admission and hospitalization requirements. Patients in the emergency room with pneumonia may benefit from using the NEWS-L or NEWS score to assist determine their likelihood of dying, needing hospitalization, or requiring intensive care.

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