Predicting long-term mortality in hospitalized patients with community-acquired pneumonia (CAP)
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ABSTRACT

Introduction: The literature clearly indicates that hospitalized patients with CAP are at risk for increased long-term mortality. Severity scores such as the Pneumonia Severity Index (PSI) and CRB-65 have been developed to predict the risk of short-term mortality (30 day). The ability of these scores to predict long-term mortality (1 year or 5 years) is not well defined.

Objectives: The objective of this study was to evaluate and compare the ability of the PSI and CRB-65 for predicting 1 year and 5 year mortality in hospitalized patients with CAP.

Methods: This was a secondary data analysis of the Community-Acquired Pneumonia Organization (CAPO) International Cohort Study database. Receiver-Operating Characteristic (ROC) curves were used to evaluate the ability of the PSI and CRB-65 to predict long-term mortality.

Results: A total of 455 patients were included in the study. The PSI was significantly better at predicting 1 year and 5 year mortality compared to the CRB-65 (1 year mortality: Area Under the ROC curve for PSI, 74%, for CRB-65, 62%, P<0.001; for 5 year mortality: Area Under the ROC curve for PSI, 69%, for CRB-65, 61%, P=0.001).

Conclusions: This study indicates that the PSI is significantly better at predicting long-term mortality compared to the CRB-65. The best Area Under the ROC curve was for PSI predicting 1 year mortality (74%). These data suggest that the PSI is still a poor predictor of long-term mortality and new methods for predicting these outcomes in hospitalized patients with CAP are needed.

INTRODUCTION

- Community-acquired pneumonia (CAP) is a leading cause of death in the United States [1]. The literature clearly indicates that hospitalized patients with CAP are at risk for increased long-term mortality. [2-5] A summary of these studies can be found in Table 1.
- Severity scores such as the Pneumonia Severity Index (PSI) and CRB-65 have been developed to predict the risk of short-term mortality (30 day). However, there is less data on predictors of long-term mortality.
- The objective of this study is to develop a prediction score for one-year and five-year mortality in hospitalized patients with CAP.

Table 1: Summary of published studies evaluating long-term mortality after CAP hospitalization

<table>
<thead>
<tr>
<th>Author</th>
<th>Study population</th>
<th>Time</th>
<th>Method</th>
<th>1 year Mortality rate</th>
<th>Area Under the ROC curve %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stacee K. Levine</td>
<td>Hospitalized adults</td>
<td>1993-2001</td>
<td>Prospective cohort study</td>
<td>14%</td>
<td>46%</td>
</tr>
<tr>
<td>Louise L.</td>
<td>Hospitalized adults</td>
<td>1993-1999</td>
<td>Review of 2 studies</td>
<td>35%</td>
<td>64%</td>
</tr>
<tr>
<td>Grant W.</td>
<td>Hospitalized adults</td>
<td>1998-2001</td>
<td>Prospective cohort study</td>
<td>4.3%</td>
<td>12%</td>
</tr>
<tr>
<td>Thomas W.</td>
<td>Hospitalized adults</td>
<td>2005-2009</td>
<td>Retrospective study</td>
<td>8.3%</td>
<td>28.4%</td>
</tr>
</tbody>
</table>

Figure 1 Pneumonia severity index (PSI)
Figure 2 CURB-65 (7)

Figure 3 PSI and CURB-65 to predict 1-year mortality

Figure 4 PSI and CURB-65 to predict 5-year mortality

RESULTS

- A total of 455 patients were included in the study.
- The representation of the PSI and CURB-65 to predict 1-year mortality is shown in Figure 3.
- The representation of the PSI and CURB-65 to predict 5-year mortality is shown in Figure 4.
- The PSI was significantly better at predicting 1-year and 5-year mortality compared to the CURB-65 (1 year mortality: Area Under the ROC curve for PSI, 74%, for CRB-65, 62%, P<0.001; for 5 year mortality: Area Under the ROC curve for PSI, 69%, for CRB-65, 61%, P=0.001).

CONCLUSIONS

1. This study indicates that the PSI is significantly better at predicting long-term mortality compared to the CRB-65. However, the best area under the ROC curve was 74% for PSI predicting 1-year mortality. This data suggest that the PSI is still a poor predictor of long-term mortality and new methods for predicting these outcomes in hospitalized patients with CAP are needed.

2. Further research is needed on prognostic markers as well as surveillance and rehabilitation for CAP patients who are considered clinically cured to reduce long-term mortality.

3. Early recognition of those patients at a high risk of mortality maximizes the potential for interventions to impact on subsequent morbidity and mortality.

REFERENCES