Abstract: P5018

Prognosis of pulmonary embolism 30-day mortality risk based on five admission parameters: the PoPE score

Authors:
D Candeias Faria¹, P Freitas², J Simoes¹, AR Santos², M Santos¹, A Oliveira², D Roque¹, J Ferreira¹, M Beringuilho², J Bicho Augusto³, ¹Hospital Prof Fernando da Fonseca EPE, Cardiologia - Amadora - Portugal, ²Hospital de Santa Cruz, Cardiologia - Lisboa - Portugal, ³University College London - London - United Kingdom of Great Britain & Northern Ireland,

Topic(s):
Pulmonary Circulation, Pulmonary Embolism, Right Heart Failure – Epidemiology, Prognosis, Outcome

Citation:

Background:
Pulmonary embolism (PE) is a serious and potentially fatal form of venous thromboembolism. The Pulmonary Embolism Severity Index (PESI), and its simplified version (sPESI), are widely used for risk stratification and mortality prediction, however, the elevated number of parameters make them difficult to use an apply in everyday practice.

Purpose:
To provide a simple and easy-to-perform sensible score based on five clinical and metabolic parameters obtained in arterial blood gas (ABG) at admission: Altered Mental State (AMS), Shock Index (SI), Partial Pressure of Oxygen/Fraction of Inspired Oxygen ratio (PaO2/FiO2), blood pH and arterial lactate concentration (Lac), and to compare its performance to predict 30-day (early) mortality.

Material and methods:
In retrospective multicentric observational case-control study, 1037 patients with confirmed PE were admitted in a 24-month period. We evaluated medical charts in order to calculate PESI and sPESI risk scores. Multivariate analysis was performed to identify clinical and ABG independent predictors of all-cause mortality. Discriminative power was assessed by Receiver Operating Characteristic (ROC) curve.

Results:
A total of 1037 patients were included in the final analysis. Mean age was 69.5 ±16.6 years, 39.5% (n=410) were males. Median length of stay was 11.0 [IQR 7.0-18.0] days. Early mortality was 12.6% (n=131). SI and Lac were significantly higher in patients with early mortality (0.81 [IQR 0.66-1.01] vs 0.68 [IQR 0.57-0.82], and 2.63 [IQR 1.60-4.64] mmol/L vs 1.32 [IQR 1.00-1.90] mmol/L, respectively, p<0.0001 for both). PaO2/FiO2and pH were significantly lower in patients with early mortality (231 ±120 vs 303 ±103, and 7.39 ±0.14 vs 7.43 ±0.07, respectively, p<0.0001 for both). There was a significantly higher proportion of patients with altered mental status (Glasgow Coma Scale <15) in patients with early mortality (55.0% vs 18.5%, c²(1)=85.3, p<0.0001). Multivariate analysis is summarized in Table 1. Stratified analysis was based on the approximate cut-off value for the last quartile of SI (0.85) and Lac (2.50 mmol/L) and for the first quartile of PaO2/FiO2(250) and pH (7.35). Based on the similar beta coefficient values for each variable, we attributed 1 point in the presence of each following conditions: GCS <15, SI >0.85, PaO2/FiO2<250, pH <7.35 and Lac >2.50 mmol/L with a total PoPE score range 0-5. The PoPE score yielded a good prognostic performance in predicting in-hospital death using ROC analysis (AUC 0.806, 95% CI 0.767-0.845, p<0.0001). The PoPE score performance was superior when compared with PESI (AUC 0.806 vs 0.695,
AUC difference 0.111, p < 0.0001) and sPESI (AUC 0.806 vs 0.622, p<0.0001) – Figure 1. A PoPE score of 1 has a sensitivity of 93% and a specificity of 48% in predicting early all-cause mortality.

Conclusions: The PoPE score proves an easy and simple tool with good performance which can predict early 30-day mortality in patients admitted for PE.

### Table 1 - Multivariate analysis

<table>
<thead>
<tr>
<th>Outcome: 30-day mortality</th>
<th>Regression Coefficient</th>
<th>Chi-square</th>
<th>p-value</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock index ≥ 0.85</td>
<td>-0.951</td>
<td>19,670</td>
<td>&lt; 0.0001</td>
<td>2.59 (1.70-3.93)</td>
</tr>
<tr>
<td>Arterial pH &lt; 7.35</td>
<td>-0.923</td>
<td>14,355</td>
<td>0.003</td>
<td>2.61 (1.38-4.54)</td>
</tr>
<tr>
<td>PaO2/FiO2 &lt; 250</td>
<td>-0.622</td>
<td>8,589</td>
<td>0.005</td>
<td>1.86 (1.22-2.84)</td>
</tr>
<tr>
<td>Lactate &gt; 2.50 mmol/L</td>
<td>-1.069</td>
<td>21,458</td>
<td>&lt; 0.0001</td>
<td>2.88 (1.84-4.50)</td>
</tr>
<tr>
<td>Altered Mental State</td>
<td>-1.414</td>
<td>45,044</td>
<td>&lt; 0.0001</td>
<td>4.12 (2.71-6.21)</td>
</tr>
</tbody>
</table>

![Figure 1 - Receiver operating characteristic curves for each score](image-url)