Reperfusion in high-risk acute pulmonary embolism: can the PESI score predict outcomes?

M. Martinho, R. Cale, S. Alegria, F. Ferreira, M.J. Loureiro, T. Judas, M. Ferreira, A. Gomes, F. Delerue, H. Pereira

Hospital Garcia de Orta, Almada, Portugal

Introduction: Acute pulmonary embolism (PE) is one of the leading causes of cardiovascular death worldwide. Haemodynamic (HD) instability defines high risk (HR) of early mortality and reperfusion treatment is the standard of care for rapid relief of right ventricle (RV) overload in these situations. The impact of reperfusion in long-term outcomes is not well established. The PE Severity Index (PESI) score is used to stratify the risk of early death in HD stable patients (pts) and was not validated to predict outcomes in HR-PE.

Purpose: Estimate the prognostic performance of the PESI score in HR-PE and study its possible interaction in acute and long-term outcomes of reperfusion in HR-PE pts.

Methods: Retrospective single-centre study of consecutive HR-PE pts, defined by the 2019 ESC guidelines criteria, between 2008–2018. Logistic regression analysis was performed to test for an interaction between tertiles of the PESI score and reperfusion in early-mortality (during hospitalization and at 30 days) as well as 1-year MACE (a composite of cardiovascular mortality, PE recurrence or chronic thromboembolic pulmonary hypertension).

Results: Of a total of 1955 PE pts, 102 fulfilled the inclusion criteria (72.5% pts initially presented with HD instability with the remaining developing HR-PE after hospital admission). Mean age was 68±15 years and 60% were females. In-hospital and 30-day mortality were 39.6% and 43.0%, respectively. At one-year follow-up, MACE was 55.0%. Mean PESI at the time of HR-PE diagnosis was 200±39 and showed significant differences for in-hospital mortality (189±38 vs 217±34; OR 1.02, 95% CI 1.00–1.03, p<0.001), 30-day mortality (191±38 vs 214±36; OR 1.02, 95% CI 1.00–1.03, p=0.004) and 1y-MACE (186±41 vs 214±32; OR 1.02, 95% CI 1.01–1.03, p<0.001). Total reperfusion rate was 57.8% and was also associated with lower in-hospital mortality (OR 0.45, 95% CI 0.20–1.02; p=0.057), 30-day mortality (OR 0.35, 95% CI 0.15–0.80; p=0.012) and 1y-MACE (OR 0.35, 95% CI 0.15–0.80; p=0.014). The benefit of reperfusion was significantly influenced by the PESI score categorized by tertiles (figure 1).

Conclusions: Although the PESI score stratifies HD stable pts, in this population it was able to predict cardiovascular outcomes in HR-PE pts. Furthermore, it showed a significant interaction with the prognostic impact of reperfusion in early and late cardiovascular outcomes.

Hospital death

PESI score	Rep	Non-Rep	OR (%CI)	P for interaction
<185	13,0%	27,3%	0,40 (0,07-2,42)	
185-220	40%	27,3%	1,78 (0,36-8,81)	0,026
>220	46,7%	73,7%	0,31 (0,07-1,32)	

30-day Mortality

PESI score	Rep	Non-Rep	OR (%CI)	P for interaction
<185	18,2%	36,4%	0,39 (0,07-2,00)	
185-220	35,0%	45,5%	0,65 (0,14-2,90)	0,019
>220	46,7%	73,7%	0,31 (0,07-1,32)	

1-year MACE

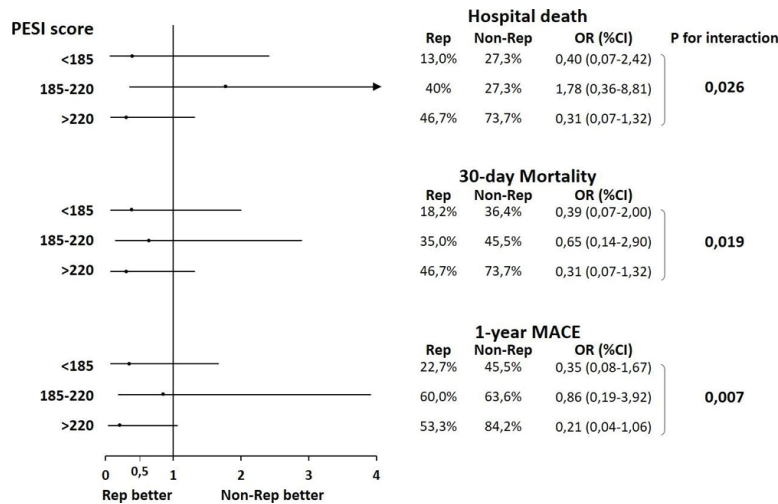| PESI score	Rep	Non-Rep	OR (%CI)	P for interaction
<185	22,7%	45,5%	0,35 (0,08-1,67)	
185-220	60,0%	63,6%	0,86 (0,19-3,92)	0,007
>220	53,3%	84,2%	0,21 (0,04-1,06)	

Figure 1. Interaction between PESI and reperfusion