Management and outcome of high-risk pulmonary embolism in intensive care units: results from a retrospective single-center analysis

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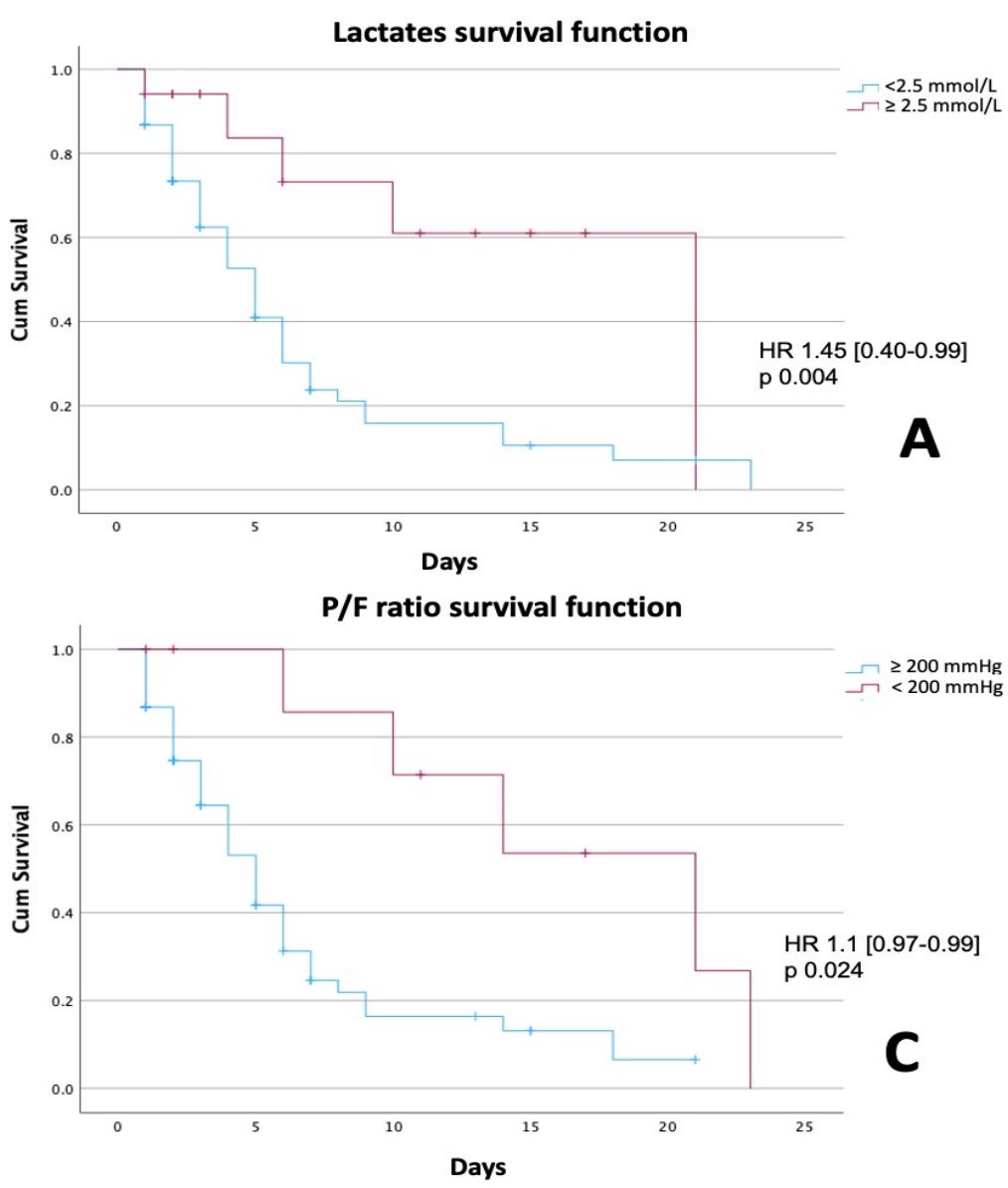
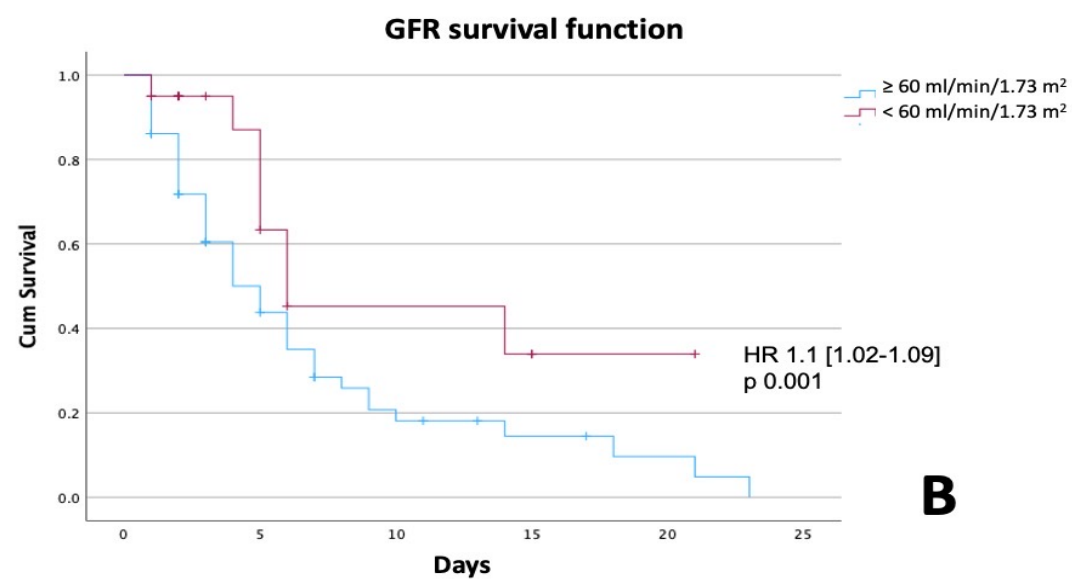
Background High-risk pulmonary embolism (PE) patients are exposed to hemodynamic/multiorgan compromise including sustained hypotension, cardiogenic shock and/or cardiac arrest (CA). Few data exist on management and outcome in patients admitted to intensive care units (ICU) with high-risk PE.

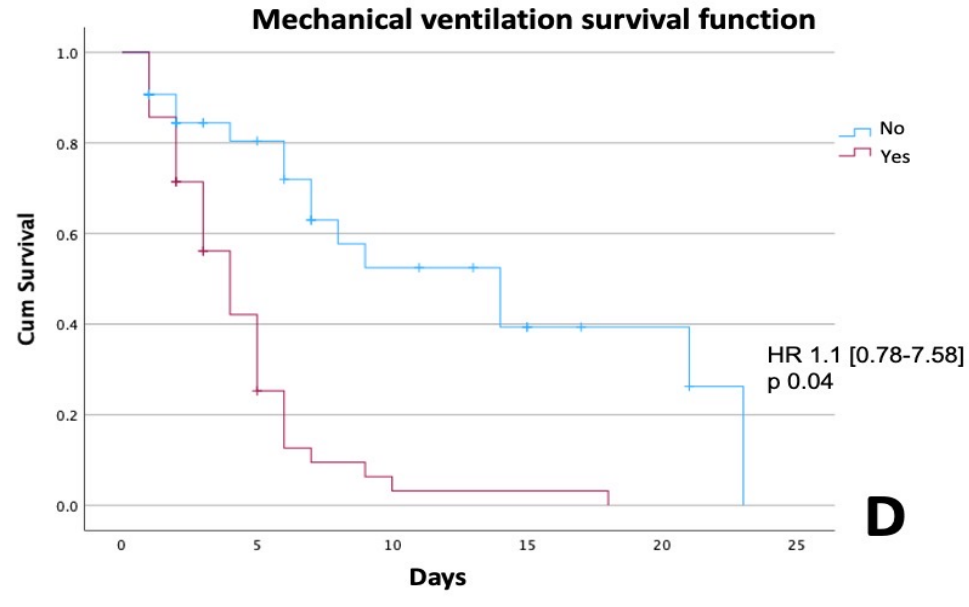
Purpose We sought to analyse the epidemiology, management and outcome of patients admitted to ICU due to high-risk PE.

Methods Retrospective monocentric analysis of adult patients with high-risk PE admitted from 2017 to 2023; COVID-19 patients have been excluded. Demographic, clinical presentation, management and outcome data have been collected. Descriptive analysis comparing means adjusted for organ involvement severity and Cox regression analysis were performed.

Results 85 patients (55 male, 63±12 years old, BMI 29.06±6) were included. All patients received the diagnosis through the computed tomography angiography except 4 of them who underwent extra-corporeal cardiopulmonary resuscitation (eCPR) and the diagnosis was made with trans-oesophageal echocardiography. The overall mortality was 32%, the eCPR rate was 9%. 92% were treated with adrenergic drugs (norepinephrine 78%, dobutamine 65%, epinephrine 35%); 7 patients required VA ECMO due to CA. 42 patients received mechanical ventilation (MV) during the first 12 hours since admission; those patients had higher rate of CS (p <0.001), higher lactates (mean difference 1.45±3.2; p <0.001), higher SOFA and SAPS II scores (respectively, mean difference 12.5±0.49 and 7.9±3.4; p 0.004). 75 patients underwent systemic thrombolysis. 10 patients with contraindication to systemic thrombolysis, underwent catheter directed thrombolysis (CDT); in 6 cases CDT was preceded by mechanical suction thrombectomy. Patients undertaking CDT had higher SOFA score at admission (mean difference 2.45±1.6; p 0.04), worsen creatinine (p <0.001), lower PaCO2 (mean difference -0.54±5.3; p 0.01), higher PaO2 (mean difference 28.7±6.5; p 0.009), higher bilirubin (mean difference 3.2±1.6; p <0.001) and lower systolic blood pressure (mean difference -6.8±3.36; p 0.01). At the Cox regression, higher lactates (panel A), lower glomerular filtration rate (panel B), higher bilirubin (HR 2.6 [1.20-6.03,] p 0.016), higher ALT (HR 1.07 [0.95-0.99], p 0.04), lower PaO2/FiO2 ratio (panel C), MV (panel D) and VA-ECMO (HR 2.5 [1.25-3.54], p 0.002) were associated with increased mortality; CDT was associated with lower mortality (HR 0.82 [0.68-1.89], p 0.04).







Conclusions High-risk PE was burdened by high mortality. Signs of worsen organ failure and respiratory and mechanical support are associated with increased mortality. In this monocentric population the use of CDT was performed when systemic thrombolysis contraindicated and it was associated with favourable outcome, although the small sample should warn contextualization in results' interpretation.

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