

# Comparison of the ratio of red blood cell distribution width to albumin concentration and Pulmonary Embolism Severity Index as prognostic factors for 30-day mortality in pulmonary embolism

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**Introduction:** The Pulmonary Embolism Severity Index (PESI) is a well-validated tool for prediction of 30-day mortality in acute pulmonary embolism (PE) patients, but it still requires additional improvement in early mortality risk estimation. Simple, cost-effective and widely accessible markers are needed as reliable supplementary tools to PESI score in any clinical or organizational setting.<sup>1,2</sup> The aim of this study was to compare the predictive value of well-known and validated PESI score and the ratio of red blood cell distribution width (RDW) to albumin concentration (RAR) for 30-day mortality in patients diagnosed with PE, along with evaluating RDW and albumin as individual biomarkers.

**Patients and Methods:** A double-center analysis included 712 patients hospitalized for pulmonary embolism from January 2013 to September 2023.

**Results:** Of the hospitalized patients, 56,5% were women. The median age was 73 years (interquartile range IQR:61-80). The median PESI score was 102 points (IQR:70-135). A total of 20,1% of patients had malignant disease in their medical history. The median RDW was 14.2% (IQR 13.3-15.6), albumin level was 37 g/L (IQR: 32-40), while for RAR was 3.98 dl/g (IQR: 3.42-4.89). The 30-day mortality was 12.2%. Patients were categorized into two groups: a low RAR group and high RAR group with median RAR of 3.988 g/dL. Those with higher RAR were significantly older, more often female and had a lower BMI ( $P < 0.05$  for all analyses). In a multivariate logistic regression model that analyzed RDW  $> 14.6\%$ , albumin  $\leq 34$  g/L, RAR  $> 4.41$  dl/g and PESI  $> 121$ , RDW  $> 14.6$  (OR 2.71, 95% CI (1.34-5.47),  $P = 0.005$ ), albumin  $\leq 34$  g/L (OR 2.9, 95% CI (1.29-6.51),  $P = 0.009$ ) and PESI  $> 121$  points (OR 6.9, 95% CI (3.72-12.79),  $< 0.001$ ) were recognized as mutually independent predictors of 30-day mortality, while RAR did not statistically significantly contribute to prognosis in the context of other analyzed parameters.

**Conclusion:** In patients with pulmonary embolism, RDW and albumin can provide additional prognostic information compared to the PESI score. However, their ratio (RAR) does not contribute additionally to the prognosis of 30-day mortality when RDW and albumin are taken into account as individual parameters.

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## LITERATURE

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