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Title: Carbonic anhydrase IX in the prediction of right ventricular dysfunction in patients with hemodynamically stable acute pulmonary embolism

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Body: Background:Right ventricular dysfunction(RVD) defined by echocardiography and/or by natriuretic peptides is a well known predictor of prognosis in pulmonary embolism(PE) patients.Aims and objectives:This study investigated carbonic anhydrase IX levels for predicting echocardiographic RVD in PE patients. Methods:Carbonic anhydrase IX and other cardiac biomarkers were compared between the pulmonary embolism patients with and without RVD on echocardiography.Results:A total of 150 normotensive PE patients were included.The levels of carbonic anhydrase IX,NT-proBNP and high sensitive cardiac troponin T were significantly elevated in PE patients with RVD on echocardiography($p<0.05$).A receiver operating characteristic curve analysis showed a AUC(area under the curve) value of 0.751 for carbonic anhydrase IX, 0.714 for NT-proBNP and 0.650 for high sensitive troponin-T to predict RVD on echocardiography.The cut-off value to predict right ventricular dysfunction were 32.45 pg/mL for carbonic anhydrase IX(sensitivity: 89.3.2%, specificity: 51.1%).There was a significant positive correlation between the carbonic anhydrase IX level and systolic pulmonary arterial pressure on echocardiography ($r=0.21$; $p=0.035$).Carbonic anhydrase IX > 32.45 pg/mL was significant independent predictors of right ventricular dysfunction after the adjustment for the baseline characteristics at multivariate logistic regression ($p=0.027$).Conclusion:In conclusion, carbonic anhydrase IX is a significant serologic predictor of RVD in acute PE and correlates with systolic pulmonary arterial pressure.