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

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.