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**Accuracy of Cardiac Biomarkers and Computed Tomographic Signs
of Right Ventricular Dysfunction to Predict Echocardiographically
Assessed Right Ventricular Function in Patients with Acute
Pulmonary Embolism**

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Given the broad spectrum of clinical presentations of acute PE, risk stratification relies on early detection of RVD in order to identify high-risk patients who might benefit from optimized approaches in therapy. Therefore the purpose of this study was to prospectively assess the feasibility of chest CT parameters and biomarkers (NT-pro-BNP and troponin I level) in order to detect echocardiographically confirmed RVD in patients with acute PE.

Between August 2008 and July 2009, 1121 patients with clinically suspected PE received CTPA. For 77 patients with confirmed PE both echocardiography for the assessment of RVD within 24 hours as well as measurements of NT-pro-BNP and troponin I were performed. RV/LV diameter ratio measured on axial and reconstructed 4-CH views and RV/LV volume ratio (RV/LV_{vol}) were assessed on CT images. CT results were compared to those from echocardiography and biomarkers.

In total 17 of 77 patients with PE suffered from RVD confirmed by echocardiography. Patients with diagnosed RVD yielded significantly higher RV/LV parameter ratios and plasma NT-pro-BNP levels if compared to those without RVD. Correlation coefficients of CT parameters and NT-pro-BNP were 0.68 for RV/LV_{vol}, 0.52 for RV/LV_{4Ch} and 0.38 for RV/LV_{ax}. No correlation was found between troponin I and CT parameters ($r < 0.4$). Values for AUC of RV/LV_{ax}, RV/LV_{4Ch}, RV/LV_{vol}, NT-pro-BNP and troponin I for detection of RVD were 0.84; 0.87, 0.93, 0.83 and 0.68, respectively. For detection of patients with severe RVD, estimates for AUC of RV/LV_{ax}, RV/LV_{4Ch}, RV/LV_{vol}, plasma NT-pro-BNP and troponin I were 0.80; 0.79, 0.94, 0.93 and 0.73, respectively. Multiple logistic regression analysis revealed that all CT parameters and NT-pro-BNP were independent predictors of RVD. An algorithm combining CT-derived ratios, NT-pro-BNP and PE location provided excellent prediction of RVD if compared to echocardiography.

In conclusion, CT-derived RV/LV_{vol} correlates favorably with echocardiography in diagnosing RVD after acute PE. Therefore, CT-derived RV/LV_{vol} might be useful in early risk stratification for patients with acute PE. Accordingly, chest CT, with or without plasma NT-pro-BNP measurements, would allow comprehensive evaluation of patients with suspected or known PE by both establishing diagnosis and providing risk stratification, especially when echocardiography is not available.