

CORRELATIONS BETWEEN ECHOCARDIOGRAPHIC FINDINGS AND SPECT CT AS A PREDICTIVE TOOL FOR CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION IN POST-PULMONARY EMBOLISM PATIENTS

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Background: Chronic thromboembolic pulmonary hypertension (CTEPH) is a severe but potentially treatable complication of pulmonary embolism (PE). SPECT CT has emerged as a non-invasive modality capable of detecting residual perfusion defects, potentially improving early risk stratification. Current guidelines rely on echocardiographic and hemodynamic assessment for CTEPH diagnosis, but these methods may lack sensitivity in early-stage disease.

Objective: To investigate the predictive value of RV echocardiographic findings and SPECT CT in identifying PE survivors at risk of developing CTEPH and to assess its role in guiding therapeutic interventions.

Methods: It is a prospective study that enrolled PE survivors who had completed standard anticoagulation period (3-6 months). Patients underwent structured follow-up, including clinical assessment (dyspnea score, 6-minute walk test), echocardiography, biochemical markers (NT-proBNP), and SPECT CT imaging. Correlations between SPECT CT findings, right ventricular dysfunction, and pulmonary hemodynamics were analyzed using multivariate logistic regression on SPSS program.

Results: Among 86 enrolled patients, 30 underwent complete imaging workup, revealing persistent perfusion defects in 60% of symptomatic individuals. Of these, 43% exhibited echocardiographic markers suggestive of chronic thromboembolic pulmonary hypertension (CTEPH), with significant associations between perfusion abnormalities and elevated NT-proBNP levels ($p < 0.001$). Echocardiographic findings suggest a strong correlation between TAPSE/PSAP rapport and the NTproBNP test ($p < 0,001$), RV strain changes ($p < 0,02$) and high probability of pulmonary hypertension ($p < 0,001$). The severity of perfusion defects on SPECT CT correlated strongly with thoracic pain ($p < 0,03$) and high probability of pulmonary hypertension ($p < 0.03$). No statistical significant correlation found between SPECT CT changes and RV strain ($p < 0,9$), 3D RVEF results ($p < 0,1$) or TAPSE/PSAP rapport ($p < 0,08$).

Conclusions: SPECT CT may represent a valuable imaging modality in early detection of post-PE sequelae, identifying patients with high probability of pulmonary hypertension who may benefit from more diagnostic tests or/and interventional and improving long-term cardiovascular outcomes. However, additional prospective scientific studies are required to draw definitive conclusions regarding its clinical utility and optimal integration into post-PE management.

Keywords: pulmonary embolism, chronic thromboembolic pulmonary hypertension, SPECT CT, TAPSE, RV echocardiography

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