

The Most Sensible Objective Markers in Echocardiography and Electrocardiography to Detect an Improvement of Pulmonary Hypertension– A Study after Percutaneous Transluminal Pulmonary Angioplasty

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Objectives:

There are many means to non-invasively evaluate pulmonary hypertension (PH). Among them, the most sensible objective markers to detect an improvement of PH with echocardiography (ECHO) and electrocardiography (ECG) were sought.

Methods:

The study subjects consisted of 36 patients with consecutive chronic thromboembolic pulmonary hypertension (CTEPH) who underwent percutaneous transluminal pulmonary angioplasty (PTPA). Sixteen variables in ECHO and ECG before and after PTPA were compared. An improvement of mean pulmonary arterial pressure (PAP) less than 25 mmHg was defined as free from pulmonary hypertension (FreePH) and a correlation of FreePH with 16 variables was analyzed using logistic regression analysis.

Results.

Median observation period from final PTPA to follow-up catheterization was 175 days. PAP was significantly reduced from 40 to 23 mmHg after PTPA ($p < 0.01$). Four variables with significant changes to FreePH were tricuspid regurgitation pressure gradient (TRPG), tricuspid annular plane systolic excursion (TAPSE), amplitude of R wave in aVR lead (RaVR) and $\{(\text{amplitude of R wave minus S wave in 1 lead}) - (\text{amplitude of R wave minus S wave in 3})\} \{(\text{R-S})_1 - (\text{R-S})_3\}$. Three variables were significantly improved after PTPA (TRPG: 69 to 39 mmHg, RaVR: 1.4 to 0.9 mm,

(R-S)1-(R-S)3: -10.8 to -3.5 mm, $p < 0.01$, respectively). Multivariate analysis revealed that TAPSE was an independent variable correlated with FreePH.

Conclusion:

TAPSE was the most sensitive variable to objectively detect an improvement of PH in echocardiography and electrocardiography.