

TITLE: Abnormalities of 24-hour Holter Monitoring in the Context of Echocardiographic and Biochemical Right Ventricle Overload in Consecutive Patients with Acute Pulmonary Embolism

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BACKGROUND: Acute pulmonary embolism (APE) is associated with various clinical outcomes, including deterioration and death. Several electrocardiographic abnormalities are observed during APE, however their influence on APE prognosis has not been comprehensively determined, especially association between heart rate variability (HRV) parameters and right ventricle (RV) overload.

METHODS: We examined 166 consecutive patients with APE: 89 women (53.6%), 56.3±18.5 years. According to recent guidelines 32 (20%) patients were classified into low-risk, 65 (40%) into intermediate-low-risk, 65% (40%) into intermediate-high-risk and 4 (0.02%) into high-risk category. Within 48-h from admission to intensive care unit, round-the-clock Holter monitoring with assessment of time-domain HRV parameters was performed in all patients, along with standard examinations including echocardiography and NT-proBNP concentration.

RESULTS: In the studied group a significant correlation between 24-h mean heart rate and associated with acute heart failure NT-proBNP level was observed ($p=0.034$, $r=0.22$).

In addition, overall and sympathetic connected autonomic tone HRV indices (especially SDNN) correlated with echocardiographic signs of RV overload (with Tricuspid Regurgitation Peak Gradient $p=0.016$, $r=-0.22$; with Right Ventricular Systolic Pressure $p=0.001$, $r=-0.31$; with Tricuspid Annular Plane Systolic Excursion $p=0.033$, $r=0.21$), as well as with the NT-proBNP level ($p=0.004$, $r=-0.36$).

Analyzing arrhythmias, only the number of supraventricular extrasystoles (SVEx) was significantly associated with increased pulmonary artery pressure: TRPG ($p=0.041$, $r=0.18$) and RVSP ($p=0.019$, $r=0.21$).

CONCLUSIONS: We observed significant association between HRV parameters as well as the frequent SVEx and echocardiographic / biochemical signs of RV overload. Our observations indicate the need for further evaluation to determine the clinical significance of this finding.