



Serial transthoracic echocardiography for clinical assessment of submassive pulmonary embolism

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Background: Limited data currently guide the evaluation and clinical management of patients with submassive pulmonary embolism (PE). Due to the heterogeneity of the submassive PE population, prospective identification of patients who require escalation in treatment is challenging. This investigation evaluates the correlation of serial transthoracic echocardiography (TTE) to clinical outcomes for submassive PE patients.

Methods: A retrospective review was performed to identify patients presenting between 2015 and 2020 to a tertiary care center with acute PE and serial TTE. Inclusion criteria were intermediate-high risk PE according to the European Society of Cardiology guidelines and at least two TTE performed during the hospitalization and prior to administration of thrombolytics or catheter directed therapy (CDT). Exclusion criteria were lack of right ventricular (RV) strain on all serial TTE. 41 patients were identified. The median interval between TTE studies was 95 hours (range 3-287 hours). Individual TTE studies were evaluated for the reported qualitative assessment of RV function. Patients were stratified into cohorts of worsening, unchanged, and improved RV function based on the qualitative TTE assessment. Data regarding the hospital course and clinical outcomes were collected including pressor requirement, intubation requirement, CDT, thrombolytic administration, and 30-day mortality.

Results: 14, 16, and 11 patients, respectively, demonstrated worsening, stable, and improving interval RV function on serial TTE. As compared to the improving RV function cohort, the worsening RV function cohort demonstrated a relative risk of death within 30 days, pressor requirement, intubation requirement and administration of tPA or CDT of 3.93, 1.83, 2.1, and 2.16 respectively. As compared to the improving RV function cohort, the unchanged RV function cohort demonstrated a relative risk of death within 30 days, pressor requirement, intubation requirement, and administration of tPA or CDT of 4.13, 1.83, 1.6, and 0.17, respectively.

Conclusions: Requirements for escalated care and a higher 30-day mortality strongly correlate with lack of improving RV function on serial TTE. Noting the limitations of the small sample size and the retrospective study design, this investigation suggests valuable and actionable clinical information may be acquired through the use of serial TTE in submassive PE patient evaluation and triage.