

Serial Transthoracic Echocardiography for Clinical Assessment of Submassive Pulmonary Embolism

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Introduction

Optimal management of submassive pulmonary embolism (PE) patients is unknown. The patient population heterogeneity and the lack of effective triage instruments complicate the prediction of clinical trajectory and identification of patients requiring escalation of therapy.

Objectives

This investigation explores the utility of serial transthoracic echocardiography (TTE) performed in submassive PE patients

Materials and Methods

A retrospective review was performed to identify patients presenting to UCDMC between 2015 and 2020 with acute 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 with a mean age of 61 years. 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.

Valuable **clinical** information may be acquired through utilization of **serial TTE** in submassive PE patient **triage and management**



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 and the unchanged RV function cohort demonstrated a higher relative risk of death within 30 days, pressor requirement, intubation requirement and administration of tPA or CDT.

Relative Risk of...	Worsening vs. Improving RV Function	Stable vs Improving RV Function
Death within 30 days	3.93 (0.53 - 28.93)	4.13 (0.57 - 29.67)
Pressor Requirement	1.83 (0.61 - 5.5)	1.6 (0.53 - 4.88)
Intubation Requirement	2.1 (0.72 - 6.09)	1.6 (0.53 - 4.88)
tPA Administration or CDT	2.16 (0.94 - 4.95)	0.17 (0.02 - 1.34)

Discussion

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.

The hypothesis-generating data developed by this investigation suggests further studies should be pursued. These studies may elucidate the value, efficacy, and feasibility of serial transthoracic echocardiograms to improve triage and outcomes in acute PE management.

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