



Carolinah HealthCare System

Goal Directed Echo and Cardiac Biomarkers in Predicting 5-Day Clinical Deterioration of Pulmonary Embolism

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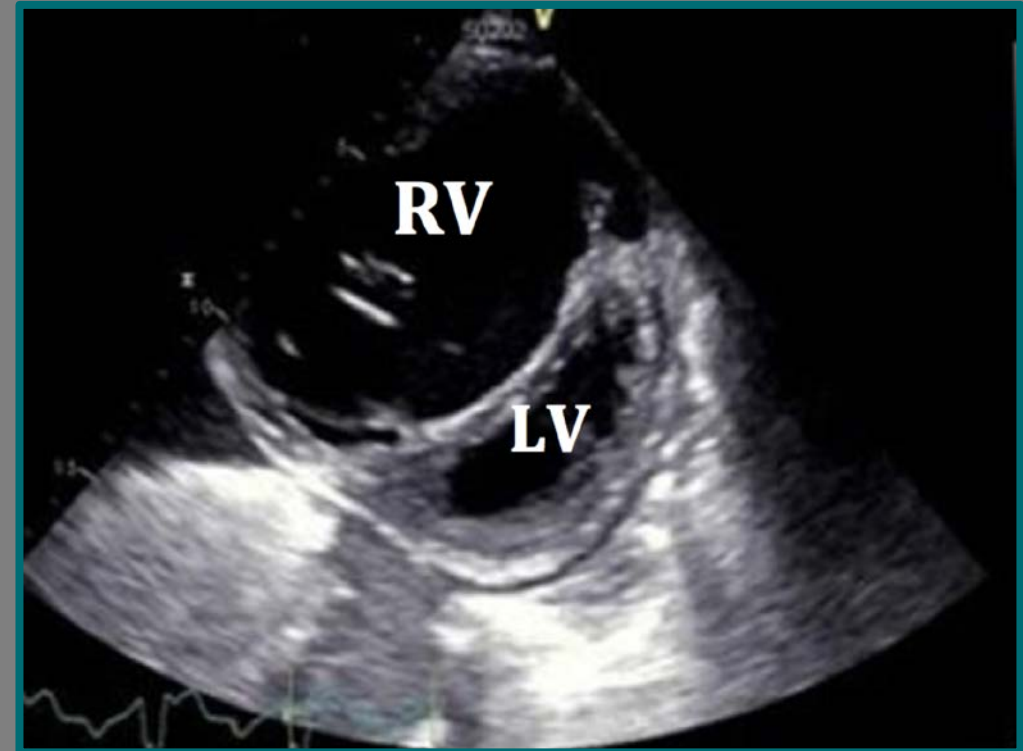
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Background



Blood clots affect as many as **900,000** Americans each year leading to approximately **100,000** premature deaths.



Background

- Pulmonary Embolism Risk Stratification
 - Goal: Provide early relevant information to predict patient outcomes
 - Current Tools: HESTIA and sPESI
 - Based on vital signs and comorbid conditions
 - No right ventricular dysfunction assessment
 - Hypothesized Tools: Troponin, BNP, Goal Directed Echo



Objective

- Identify the prognostic performance of right ventricular dysfunction by goal directed echo, BNP, and troponin risk stratification for clinical deterioration.



Methods

- Multicenter prospective observational study of consecutive ED patients with PE.
 - Carolinas Medical Center
 - Orlando Health
 - Cristiana Care
 - Vanderbilt University
 - San Diego Medical



Methods

- Serum troponin (cut off ≥ 0.07 pg/mL) and brain natriuretic peptide (BNP) (cutoff ≥ 90 ng/mL) were obtained.
- Emergency physicians performed GDE within 2 hours of diagnosis to assess for RVD (RV dilatation, RV hypokinesis and septal bowing).
- Each biomarker was assessed alone and in combination with RVD status by GDE.



Methods

- Patients were monitored during 5 days for development of clinical deterioration.

Clinical Deterioration
Death
Hypotension
Onset of new dysrhythmia
Cardiac arrest
Moderate hypoxia or respiratory distress
Severe respiratory insufficiency
Reperfusion Intervention



Results

- We enrolled 332 of intended 880 consecutive PE patients.
- Approximately 33% of ED PE patients had RVD by GDE.
- Approximately 50% of ED PE patients had one or more of the clinical deterioration events within 5 days.
- Total of 10 patients had incomplete data



Results

Characteristics	Total (n=323)
Age	57
Female Sex	53%
Charleston Index	2.2
African American	41%
Caucasian	53%



Results

	+CD	-CD	Sensitivity (95% CI)	Specificity (95% CI)	+LR (95% CI)	-LR (95% CI)
BNP	109	50	57% (50-60)	62% (53-70)	1.5 (1.2-2)	0.68 (0.55-0.84)
+GDE	95	15	51% (43-58)	89% (82-93)	4.6 (2.9-7.7)	0.55 (0.47-0.64)
BNP+GDE	60	10	55% (42-64)	87% (78.5-94)	4.5 (2.5-8.2)	0.51 (0.41-0.63)



Results

	+CD	-CD	Sensitivity (95% CI)	Specificity (95% CI)	+LR (95% CI)	-LR (95% CI)
Troponin	62	11	33% (26.5-40.4)	92% (86-95.9)	4.1 (2.3-7.5)	0.72 (0.65-0.81)
+GDE	95	15	51% (43-58)	89% (82-93)	4.6 (2.9-7.7)	0.55 (0.47-0.64)
Troponin +GDE	44	4	35% (27-44)	96% (91-99)	9.75 (3.8-25.6)	0.67 (0.58-0.76)



Conclusion

- Goal directed echo (GDE) and troponin had the highest specificities and positive likelihood ratios while BNP had the highest sensitivity and lowest negative likelihood ratio for 5-day clinical deterioration.



Limitations

- This particular abstract does not report on or address
 - Length of stay
 - PE outpatient management eligibility
 - Patient defined quality of life outcomes.



Questions?