Emergent AI: Expediting Treatment for High-Risk PE Monteleone P, Schutt, R. Department of Internal Medicine, UT Austin School of Medicine



Introduction

High-risk pulmonary embolism (PE) patients have an in-hospital mortality rate of 20.6%. In the subset of these patients who are extremely ill and who are hemodynamically compromised, mortality rate can be upwards of 42.1%.¹ Timely diagnosis and triage of these patients, the availability of advanced therapies, and development of a pulmonary embolism response team (PERT) are critical to optimal management.² Computer-aided PE diagnosis has demonstrated effectiveness for improving diagnostic capabilities in PE assessment.³ Combining computer-aided detection software with a mobile application is a proven technique for mobilizing clinicians and interventionalists in the PE care pathway.⁴ Multidisciplinary PERT teams utilizing computer-aided detection algorithms and supporting mobile applications with AIpowered notifications facilitate swift, efficient and effective emergent care for PE patients.

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RV/LV: 1.53

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Case Study

Patient Background

45-year-old, Female

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- History of partial bowel resection for perforated diverticulitis with surgical repair 4 months prior.
- Patient suffered sudden onset of severe dyspnea.

Arrived at Dell Seton **Emergency Department.**

- Dell Seton ED facility is
- 3.2 mi away from **Ascension Seton Medical** Center (ASMC).

8:30 am

- BP 70/50 Hypotensive.
- HR 150 Tachycardic.
- 70% O₂ sat Hypoxemic.
- 8:39 am
- CTPA scan acquired.
 - **Rapid PE processed and** suspected a PE.
 - **Rapid PE mobile alert** was received by team.
 - Large saddle PE found

8:41 am

Scanned at 12:25 PM Sen

- PERT interventional
 - cardiologist (IC) contacted ED from ASMC about the patient.
 - Decided to administer vasopressors as

8:51 am

Ascension Seton

A 10 min 3.5 miles

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Patient went into cardiac arrest.

NORTH UNIVERSITY

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- tPA was administered.
- Return of spontaneous circulation (ROSC) achieved.

10:00 am

- Large bore mechanical thrombectomy procedure completed.
- Hemodynamics immediately improved (MAP to 80mm Hg).

spanning bifurcation of the pulmonary artery.

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RV/LV = 1.53 82Y, M

Suspected Pl 82Y, M

- patient's BP continued to drop (BP 60/50, HR 150).
- Ordered systemic tPA.
- Activated mobile ECMO team.
- Pt remained hemodynamically unstable.
- **ECMO** team and IC in transit to Dell Seton from ASMC.

Discussion

This case emphasizes the important role of AI-powered technology in rapid identification and notification of high-risk PE patients to PERT teams. It also highlights the ability of this technology to facilitate timely resource allocation among hospitals within a network. Utilizing the RapidAl PE (iSchemaView, Inc.) Al module, the suspected PE was promptly identified shortly after CTPA acquisition. The Rapid mobile application alerted relevant stakeholders and enabled seamless communication between PERT members, facilitating a quick assessment of the patient's deteriorating condition and informed decision-making regarding treatment. This real-time communication infrastructure played a pivotal role in orchestrating the multidisciplinary response required for emergent PE care.

Efficient team coordination compressed the timeline from diagnosis to intervention significantly. Within minutes, the patient progressed from CTPA to tPA administration and activation of the ECMO team, culminating in an emergent catheter-based thrombectomy intervention. This rapid escalation of care directly contributed to a successful outcome, evidenced by ROSC following tPA administration and immediate hemodynamic improvement post-thrombectomy.

The activation of PERT exemplifies proactive management of high-risk PE patients. Though escalation of care beyond thrombectomy was not needed, the ECMO team was on standby and ready to act due to advanced notification.

In conclusion, AI technology integration has improved the management of acute medical emergencies like PE. By facilitating early detection, real-time communication, and multidisciplinary collaboration, these innovations have significantly improved treatment timelines and patient outcomes, ultimately saving lives.

References

- 1. Kobayashi T, Pugliese S, Sethi SS, Parikh SA, Goldberg J, et al. Contemporary Management and Outcomes of Patients With High-Risk Pulmonary Embolism. J Am Coll Cardiol. 2024;83:35-43.
- 2. Shapiro A, Reichard A, Chowdhry S, Fellner A, Broering M. The Use of Artificial Intelligence Technology in the Detection and Treatment of Pulmonary Embolism at a Tertiary Referral Center. J Vasc Surg. 2023;78: e23.
- 3. Tajbakhsh N, Shin JY, Gotway M, Liang J. Computer-aided detection and visualization of pulmonary embolism using a novel, compact, and discriminative image representation. *Med Image Anal.* 2019;58:101541.
- 4. Al-Kawaz M, Primiani C, Urrutia V, Hui F. Impact of RapidAl mobile application treatment times in patients with large vessel occlusion. J Neurointerv Surg. 2022; 14(3):233-236.
- Disclosures: Peter Monteleone is a consultant for RapidAI.