Implementation of an AI-Enabled PERT Workflow for Dynamic Risk Stratification in Pulmonary Embolism Across a Multi-Hospital Health System

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Background

Timely and accurate risk stratification in pulmonary embolism (PE) is essential for effective clinical management and PERT activation. We evaluated a novel AI-driven PERT workflow (Aidoc, Tel Aviv, Israel) deployed across a large, integrated health system. This workflow integrates imaging AI with electronic health record (EHR) data and mobile-based clinical tools to deliver real-time risk assessment and decision support.

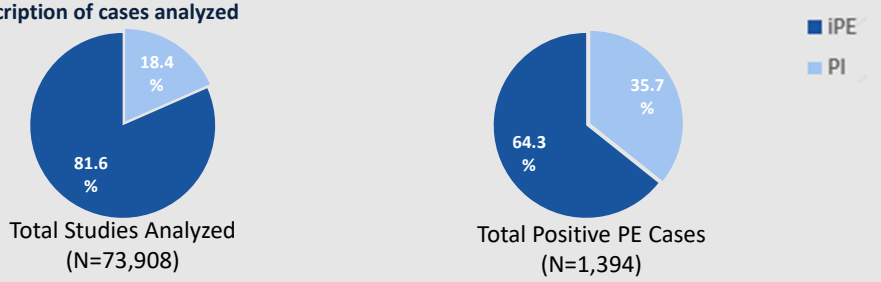
Methods

In this six-month study (September 2024 to March 2025), we assessed the system-wide deployment of an AI-enabled platform for automated PE detection and risk stratification. The workflow included, inclusion of all CT pulmonary angiograms (CTPA) ordered for suspected pulmonary embolism (PE) and all contrast-enhanced chest CTs where incidental PE (iPE) may be detected. AI-based identification of central emboli and automated right ventricle/left ventricle (RV/LV) ratio was calculated automatically from imaging. Automated extraction of EHR data—including vitals, lactate, troponin, BNP, and vasopressor requirements—occurred for a 24-hour window. Dynamic stratification into three risk tiers: High Risk, Intermediate Risk, and Low Risk, occurred in real time based on the imaging and EHR feed based on institution-specific criteria (see Figure 1). The risk classification was continuously monitored and updated via the Aidoc mobile application. Clinicians received configurable, real-time alerts when patients crossed risk category thresholds due to changes in EHR data. This allowed for dynamic, patient-specific monitoring for up to 24 hours post-imaging.

Table 1: Overview of the risk category definition triggering AI alerts in the Mobile App using both imaging and labs/vitals characteristics

Risk Category	Institutional Specific Criteria
High	Central PE AND RV/LV ratio > 0.9 AND Plus Oxygen > 6 L AND Vasopressor Requirement AND Lactate > 3 AND HR/SBP > 1
Intermediate	Central PE AND RV/LV ratio > 0.9 AND HS Troponin > 45 OR BNP > 100
Low	Central PE AND RV/LV ratio > 0.9

Figure 1: Description of cases analyzed



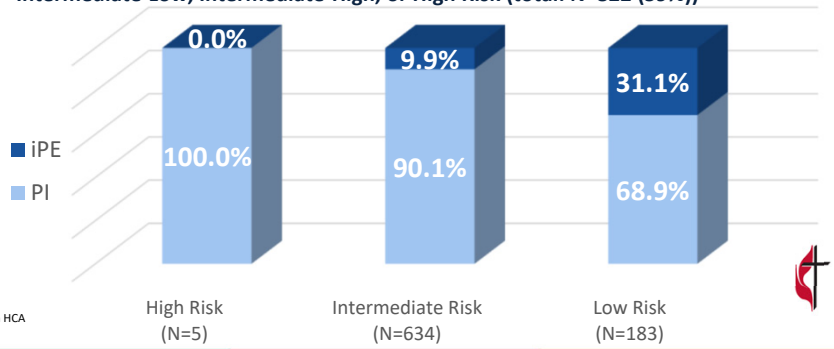
Results

During the study period, 73,908 contrast-enhanced CT studies were analyzed by the AI system. Of these, 82% (60,326/73,908) were contrast chest CTs (for incidental PE), and 18% (13,582/73,908) were CTPA exams for suspected PE. A total of 1,394 studies were positive for PE, comprising 36% (498/1,394) incidental PE (iPE) and 64% (896/1,394) from dedicated CTPAs. Among positive cases, 59% (822/1,394) were categorized as Intermediate-Low, Intermediate-High, or High Risk. Of this 59%, 5 patients met institutional-specific criteria for High Risk (100% PE [5/5], 0% iPE [0/5]), 634 for Intermediate Risk (90% PE [571/634], 10% iPE [63/634]), and 183 for Low Risk (69% PE [126/183], 31% iPE [57/183]). This included 3 patients (100% PE) that changed from Intermediate Risk to High Risk due to labs & vitals. The AI-driven, mobile-enabled platform facilitated real-time alerting, allowing prompt and targeted PERT engagement.

Conclusion

This study demonstrates that an AI-enabled, mobile-integrated PERT workflow can automate PE detection and dynamically stratify risk in real time across a large health system. By integrating imaging findings with continuously monitored EHR data, the platform enables earlier, data-driven intervention and resource allocation. These findings support broader implementation of intelligent, alert-based PE management to standardize care and enhance patient outcomes.

Figure 2: Breakdown of patients based on institutional specific criteria with automated assignments of Intermediate-Low, Intermediate-High, or High Risk (total: N=822 (59%))



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