Implementation of an AI-driven PERT Workflow at a Large Academic Institution

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Background

Since its implementation in 2018, the PERT model at University Hospitals has contributed to significant improvement in morbidity and mortality outcomes for patients with pulmonary embolism (1,2). However, activation delays due to reliance on multiple communication nodes persist, potentially impacting time-to-intervention and clinical outcomes. Streamlined activation and quick identification of intermediate to high-risk patients remains a critical target for quality improvement.

Methods

An AI (Artificial Intelligence) based detection and notification protocol was deployed in partnership with AIDOC. The AI model continuously evaluates CT pulmonary angiograms for features suggestive of clinically significant PE—specifically peri-central thrombus burden and RV strain (RV/LV ratio >1.0). Upon detection, alerts are pushed to the PERT team via a mobile platform with integrated hemodynamics, imaging, and lab data to support rapid multidisciplinary assessment. PERT activations through the traditional method remained active during this time period as well.

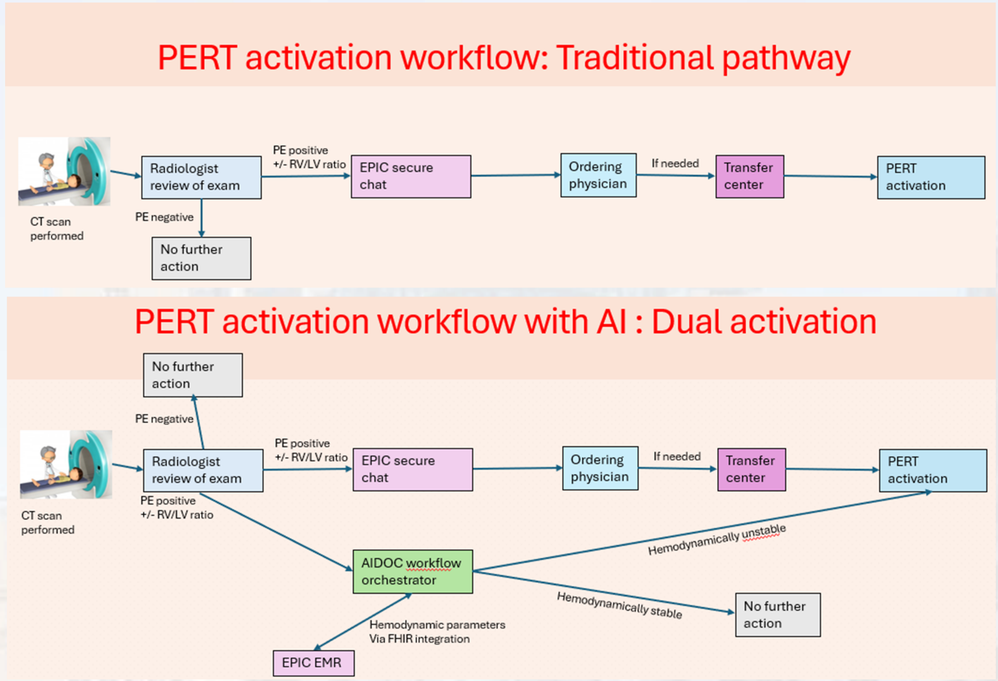

Figure 1: Comparison of Traditional pathway and Dual Activation pathway which integrates an AI workflow orchestrator to streamline PERT activations

Results

Between July 2024 and April 2025, 26,168 CTPAs were processed. AI identified 1,532 PE-positive studies, of which 383 met criteria for AI-driven PERT activation. Concurrently, traditional PERT activation through the pager system yielded 552 cases in the same time period. Dual activation occurred in 247 of these cases; 136 were AI-only and 300 traditional-only. RV/LV ratios were significantly elevated in AI-activated cases vs. traditional-only (1.39 ± 0.31 vs. 1.09 ± 0.21; $p<0.001$). Procedural interventions occurred in 33.6% of dual-activation cases, compared to 9.7% in traditional-only activations ($p<0.001$). Importantly, 10.8% of patients undergoing a procedure were identified exclusively via AI pathway.

Conclusion

AI-integrated PERT activation facilitates early identification of intermediate-to-high-risk PE with radiologic and hemodynamic criteria, reducing activation latency and expediting multidisciplinary evaluation. This hybrid AI-clinician model may redefine response paradigms in PE management.

Reference

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