Directing Care with Point of Care Artificial Intelligence: Clinical Impact of Establishing Purposeful Outpatient AI - Directed Management of Incidental Pulmonary Emboli

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Introduction

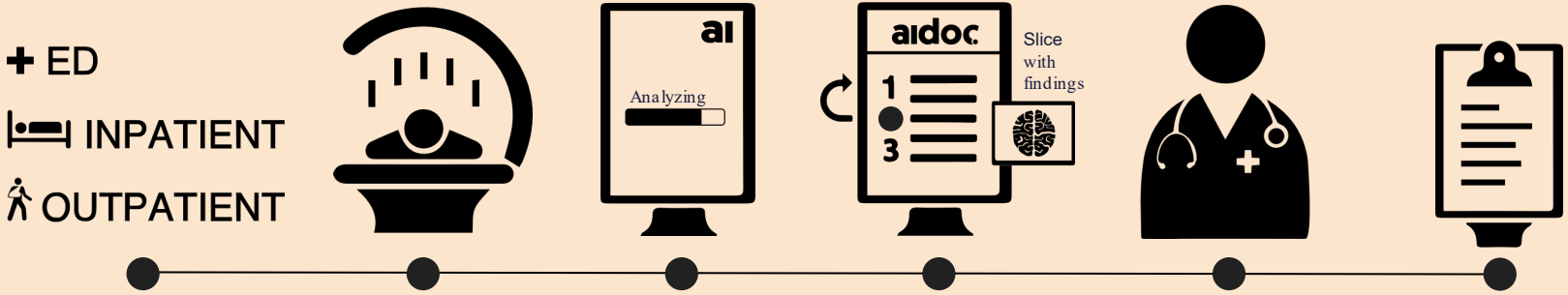
- **Background** : Translating AI results into actionable clinical care requires effective IT infrastructure and practitioner support.
- **Goal**: Evaluate the impact of an AI-guided triage system for detecting incidental pulmonary emboli (iPE) on outpatient CT imaging and expediting patient referral to the emergency department (ED).

Methods

- 11,700 outpatient contrast CT scans that included the chest were analyzed with an AI computer aided triage system from July 2023- March 2024.

- Patients with confirmed iPE were transferred to the ED for further clinical evaluation.

Workflow



Turn Around Time

Turn Around Time (TAT): Time from initial imaging acquisition to report completion.

Results

AI Detected : 80 iPE cases confirmed by radiologists.

Patient Demographics and Clinical Features :

- Mean age: 62.7 years.
- Gender: 60% male, 40% female.
- 94% had an oncologic diagnosis.
- 35% of iPEs were categorized as segmental.

Results Continued

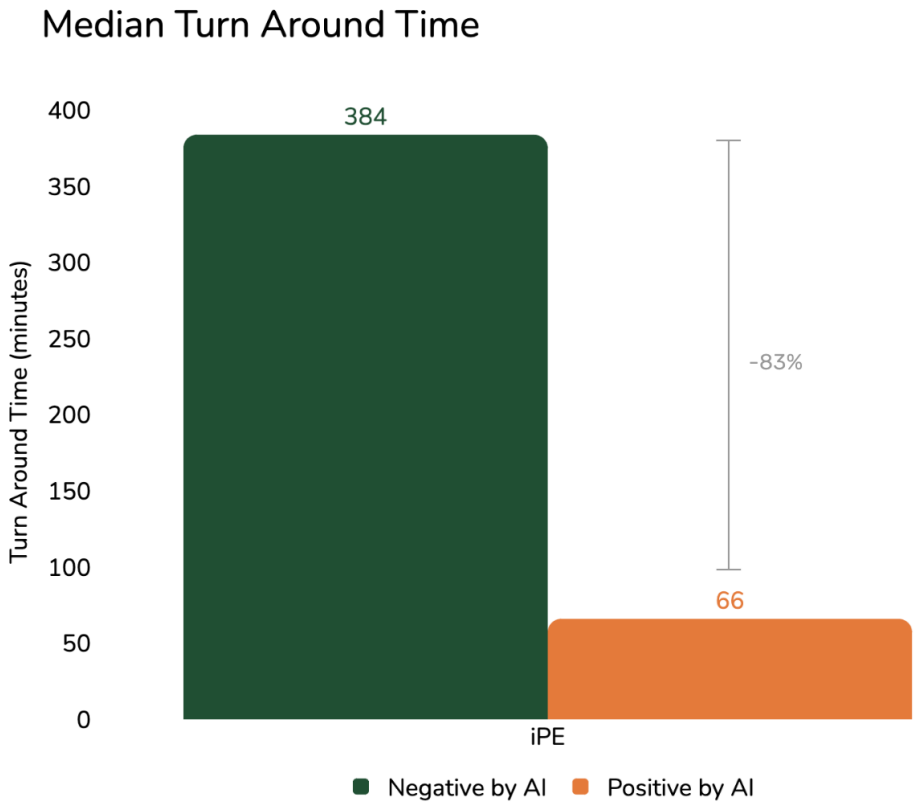
Time Efficiency :

- Median turnaround for iPE cases: 66.4 minutes (vs. 383.6 minutes for negative cases).
- 82.7% reduction in wait time (317.2 minutes) between positive and negative cases.

Clinical Outcomes :

- 29% of iPE patients went directly to the ED (28 patients).
- 78% of ED patients were admitted with an average LoS of 4.4 days
- 83% started on anticoagulation.
- 4 PERT activations, 1 mechanical thrombectomy.

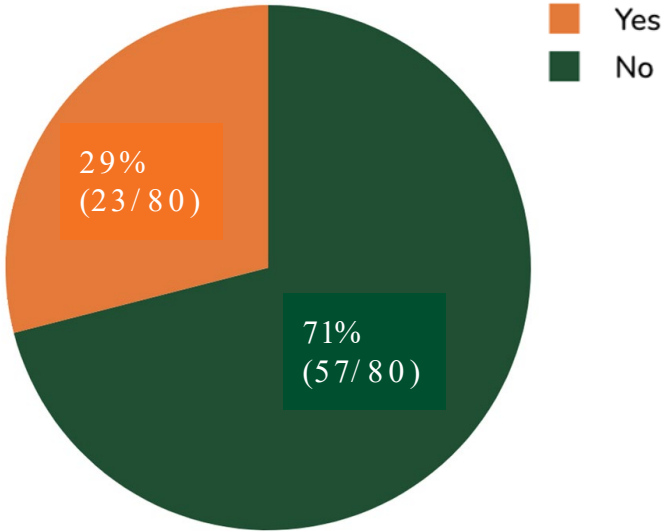
Results Continued



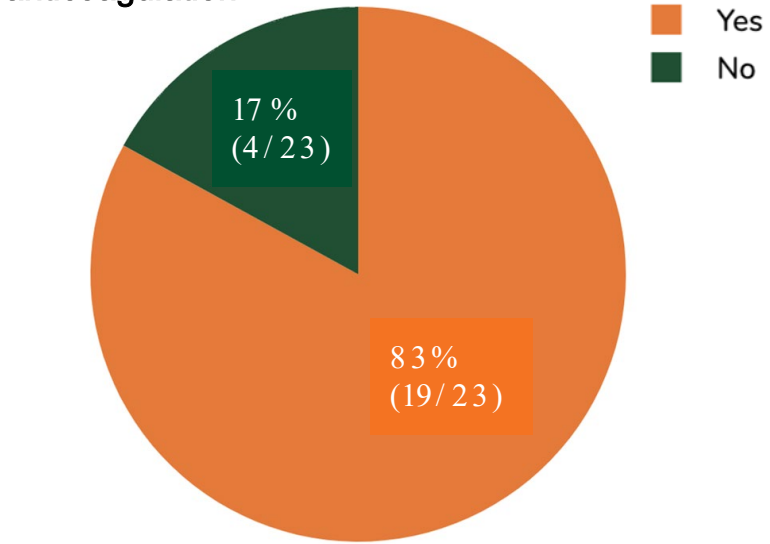
Patient Flow

Outpatients 11,700 Patients → iPE Patients 80 Patients → ED Admission 23 Patients → Hospital Admission 18 Patients

ED Admission



ED Admitted patients who received anticoagulation



Clinical Significance

- **Reduced turnaround time:** AI integration significantly decreased turnaround times for incidental pulmonary emboli (iPE) from 383.6 minutes to 66.4 minutes for iPE ensuring faster patient management (82.7% reduction).
- **Improved patient outcomes:** AI-enabled workflows facilitated the rapid identification and treatment of critical incidental findings, resulting in more timely and effective patient interventions.
- **Optimized workflow efficiency:** The combination of AI and human intervention (HI) streamlined the care process by enabling radiologists and allied healthcare professionals to quickly prioritize and manage actionable incidental findings (AIFs).

Clinical Significance Continued

- **Better coordination of care:** AI flagged critical cases for radiologists and healthcare teams, improving collaboration and ensuring patients were promptly referred to the emergency department for necessary care.
- **Cost - effective healthcare delivery:** The Point-of-Care AI Deployment (POC-AID) workflow demonstrated the potential to deliver rapid, effective care for incidental findings in a cost-efficient manner.
- **Empowerment of radiologists:** AI allowed radiologists to play a more active role in guiding the clinical management of patients with AIFs, enhancing their ability to impact downstream care.

Conclusion

- **Impact** : AI-guided triage significantly reduced turnaround times, leading to rapid ED referrals and treatment.
- **Clinical Utility** : Demonstrates how AI improves patient optimizes care in outpatient settings.
- **Future Directions** : Focus on refining AI algorithms and evaluating long-term clinical outcomes to further enhance care delivery.