

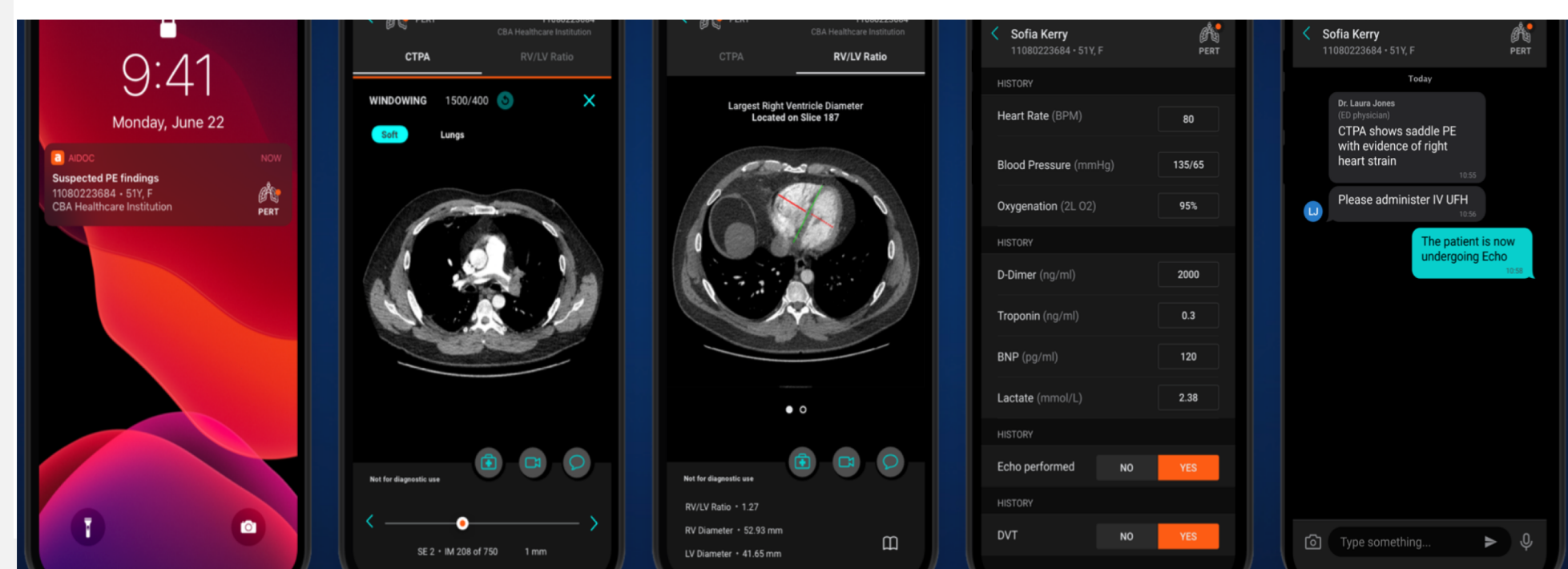


Farnaz Dadrass, M.D.¹, no COI to disclose; Anuj Dutta, B.S.², no COI to disclose; Busra Cangut, M.D., M.S.¹, no COI to disclose; Vivian Bishay, M.D.¹, no COI to disclose; Rahul Patel, M.D.¹, no COI to disclose; Dan Shilo, M.D.¹, no COI to disclose; Jenanan Vairavamurthy, M.D.¹, no COI to disclose; Robert Lookstein, M.D.¹, COI includes: AIDOC consultant.

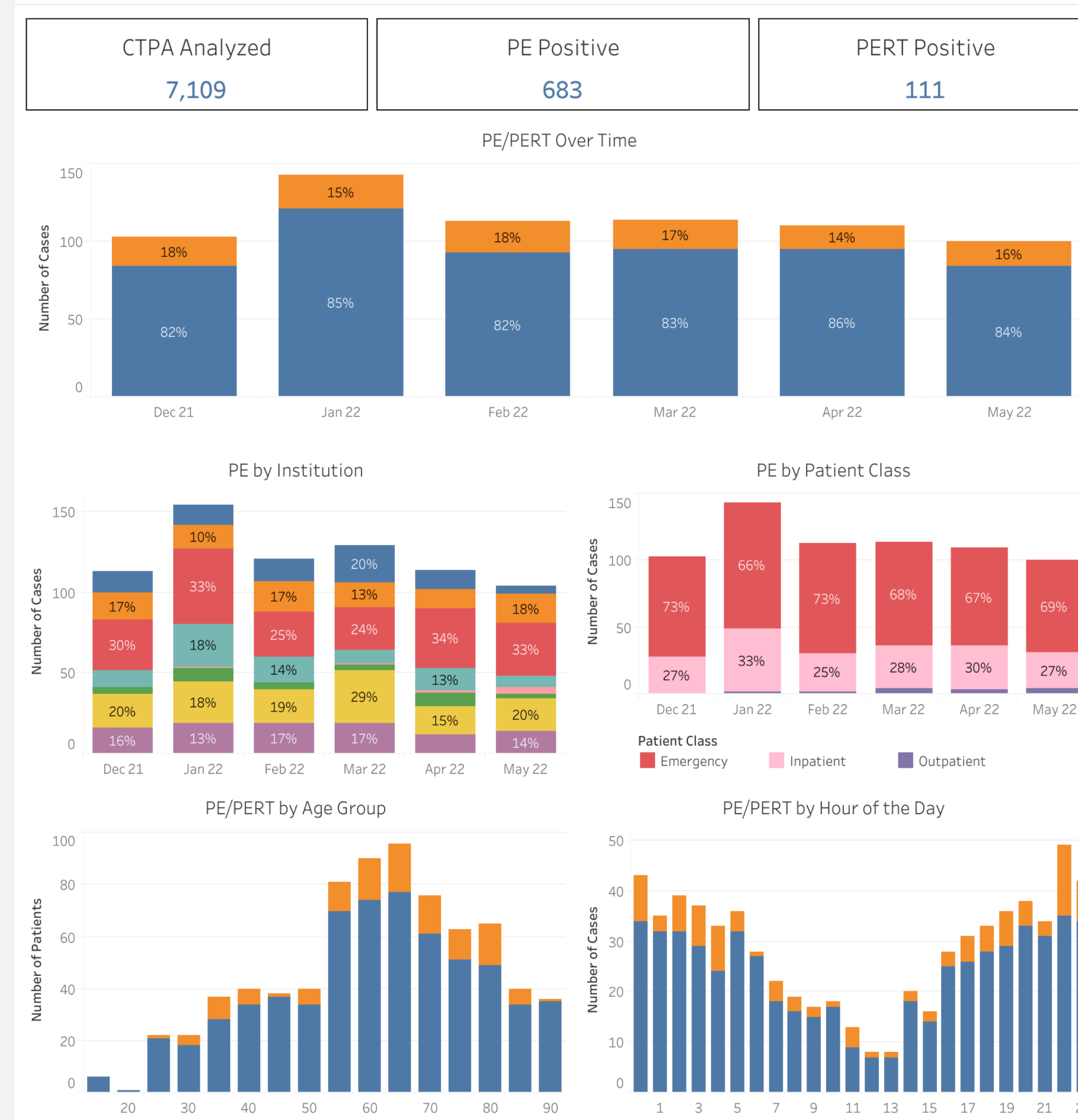
¹Department of Diagnostic, Molecular, and Interventional Radiology, Icahn School of Medicine at Mount Sinai, New York, New York, USA; ²Albert Einstein College of Medicine

BACKGROUND

- Pulmonary embolism (PE) is a highly morbid condition with a wide range of life-threatening hemodynamic effects.
- As the intersection of artificial intelligence and healthcare continues to grow, it is important to maximize its potential to collect data on a large scale to further our understanding of pertinent medical conditions, such as PE, which in turn will maximize our ability to intervene effectively.
- This study evaluated the use of AI driven data collection revolving around the management of PE in a large urban center, one of the first of its kind to use automatically generated AI software in order to optimize patient care.



METHODS



Patient sample was selected using PEs identified on CT scans throughout the hospital system from July 2023 to December 2023 using the AIDOC tool for automated triage and notification. The AI software used automatically extracted information from electronic medical records (EMRs) to compile a large database.

Variables collected included specific institution within the healthcare system, age, sex, class, right ventricle: left ventricle (RV:LV) ratio, maximum heart rate, minimum systolic blood pressure, minimum diastolic blood pressure, minimum oxygen saturation, maximum BNP, maximum troponin, maximum D-Dimer, maximum lactate.

Patients were then categorized into low risk, intermediate risk, intermediate-high, and high risk PE. Low risk PE included incidentally found PEs and those without evidence of right heart strain (as defined as RV:LV ratio < 1).

- Intermediate risk PE included patients with right heart strain (defined as RV:LV ratio ≥ 1).
- Intermediate-high risk included patients with evidence of right heart strain as well as elevated troponin (≥ 40 ng/L).
- High-risk included those who met criteria for intermediate-high as well as a systolic blood pressure ≤ 90 .

RESULTS

- Data automatically generated from AI software collected information from the EMR to instantly provide data for:
 - 1024 patients dated from July 2023 to December 2023.
 - 516 (50.3%) were male and 508 (49.6%) were female with an average age of 63.7 years. A total of 275 (26.9%) PEs were found incidentally.
- RV:LV ratio was obtained for 808 patients, 505 (62.5%) with RV:LV ratio ≥ 1 , while 288 (57.0%) had RV:LV ≤ 1 .
 - Of those with a RV:LV ratio ≥ 1 , maximum troponin was obtained in 310 of them. Of this cohort, 122 (39.4%) had elevated maximum troponin levels (as defined as ≥ 40 ng/L).
 - Among those with RV:LV ratio ≥ 1 and troponin ≥ 40 ng/L, minimum systolic blood pressure (mmHg) was measured in 109 of them.
- Twenty-three (2.2%) had a minimum systolic blood pressure ≤ 90 .
- In total, 496 (48.4%) met the criteria for low-risk PE, 406 (39.7%) met the criteria for intermediate risk PE, 99 (9.7%) met the criteria for intermediate-high risk PE, and 23 patients (2.2%) met the criteria for high-risk PE.
- Mean heart rate was 105.3 (n = 824, SD 23.1)
- Mean minimum systolic blood pressure was 109.4 (n = 806, SD = 20.1)
- Mean minimum diastolic blood pressure was 62.5 (n = 816, SD = 13.2)
- Mean minimum oxygen saturation was 91.9% (n = 816, SD = 11.5)
- Mean maximum BNP was 518 (n = 518, SD 1499.3)
- Mean maximum troponin was 465.4 (n = 553, SD = 2076.18)
- Mean maximum d-dimer was 5.1 (n = 253, SD = 5.1)
- Mean maximum lactate was 2.1 (n = 501, SD = 1.8)



Variable	Value
1 Number of patients	1024
2 Male (%)	516 (50.3%)
3 Female (%)	508 (49.6%)
4 Average age (years)	63.7
5 PEs found incidentally (%)	275 (26.9%)
6 RV:LV ratio obtained (n)	808
7 RV:LV ratio ≥ 1 (%)	505 (62.5%)
8 RV:LV ratio ≤ 1 (%)	288 (57.0%)
9 Maximum troponin obtained from RV:LV ratio ≥ 1 (n)	310
10 Elevated troponin ≥ 40 ng/L in RV:LV ratio ≥ 1 (%)	122 (39.4%)
11 Systolic BP ≤ 90 in RV:LV ratio ≥ 1 & troponin ≥ 40 ng/L (%)	23 (21.1%)
12 Low-risk PE (%)	496 (48.4%)
13 Intermediate-risk PE (%)	406 (39.7%)
14 Intermediate-high-risk PE (%)	99 (9.7%)
15 High-risk PE (%)	23 (2.2%)
16 Mean heart rate (bpm)	105.3 (SD 23.1)
17 Mean minimum systolic BP (mmHg)	109.4 (SD 20.1)
18 Mean minimum diastolic BP (mmHg)	62.5 (SD 13.2)
19 Mean minimum oxygen saturation (%)	91.9 (SD 11.5)
20 Mean maximum BNP (ng/L)	518 (SD 1499.3)
21 Mean maximum troponin (ng/L)	465.4 (SD 2076.18)
22 Mean maximum d-dimer (μ g/mL)	5.1 (SD 5.1)
23 Mean maximum lactate (mmol/L)	2.1 (SD 1.8)

Table 1. The table above serves as a summary of the data automatically extracted using an AI driven data collecting software from 1024 patients between July 2023 to December 2023.

CONCLUSIONS

- This early experience with a fully automated AI platform used to aggregate and analyze patients with acute PE in a large urban center demonstrates the potential of sophisticated software to minimize the tedious work required for meaningful data collection.
- This approach opens the door for high-quality and large-quantity data collection, enabling a better evaluation of this highly morbid disease process.

CLINICAL RELEVANCE

Looking forward, the aggregation of large volumes of data points using this sophisticated software will add prognostic value by aiding the identification of potential disparate populations, and in turn, improving patient outcomes.