Outcomes of Systemic and Catheter-Directed Tissue Plasminogen Activator for Treating High-Risk Pulmonary Emboli in a Rural U.S. Population

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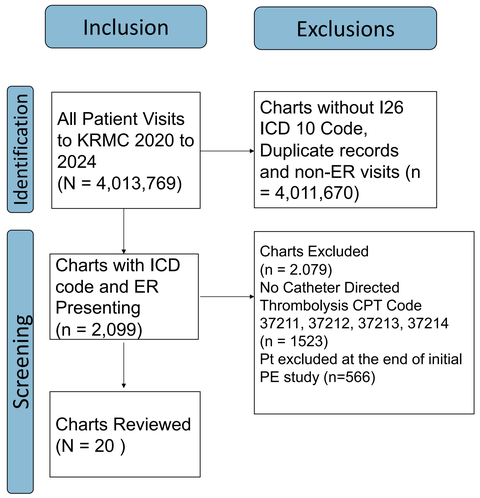
Introduction

Pulmonary embolism (PE) is a life-threatening condition in which a blood clot blocks circulation to the lungs[1,2]. In the United States, an estimated 115 cases per 100,000 are reported every year [3,4] leading to thousands of hospital admissions and between 100,000 to 300,00 deaths annually [5]. Tissue plasminogen activator (tPA) is indicated in patients with high-risk PEs defined as patients who are hemodynamically unstable. tPA can be administered into systemic circulation or through catheter-directed (CD) treatment, where a catheter is inserted through the subclavian vein directed to the thrombus [6]. More advanced treatments such as CD tPA infusion may not be available in a low resource setting such as in a rural community center [7], making systemic tPA infusion the most practical treatment. Evaluating outcomes associated with systemic versus CD tPA in such settings is necessary to inform clinical decision-making when advanced therapies are limited.

Objective

To investigate the outcomes of patients who received systematic or catheter-directed tissue plasminogen activator in a rural setting.

Methods



A retrospective chart view that includes patients presenting to the ER with Pulmonary embolism was conducted. Data abstraction was conducted using a structured data abstraction tool, and statistical analysis of risk categories (vitals, diagnostic tests, and comorbidities) and outcomes (length of stay, mortality) were conducted using student t-tests, Mann-Whitney, and Kruskal-Wallis tests.

Results

Demographics: Sex, Age Distribution, CD and Systemic tPA

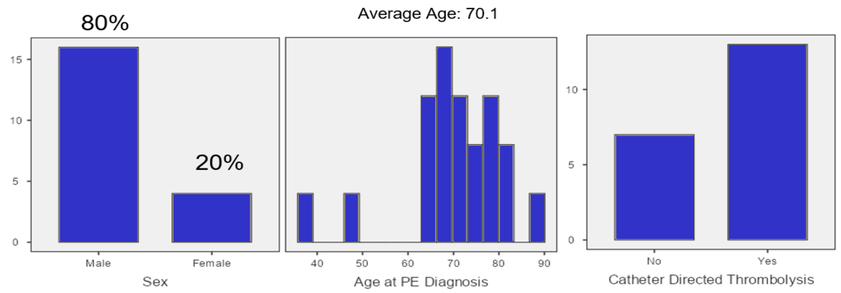


***Figure 1*:** Sex and Age Distribution of Patients included in Study (Average Age 70.1 y/o)

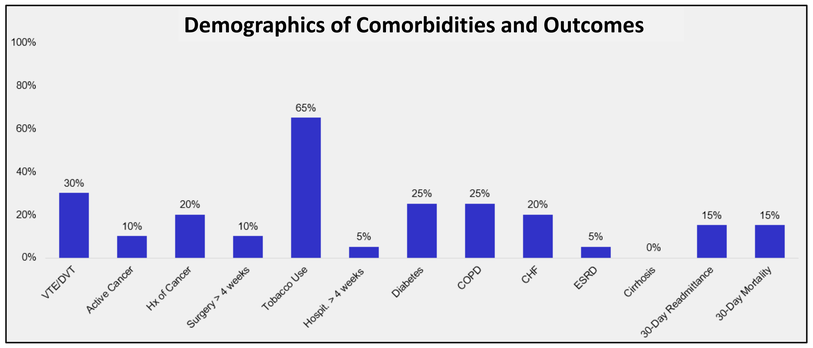


***Figure 2*:** Demographics of Comorbidities across total patient population, as well as outcomes

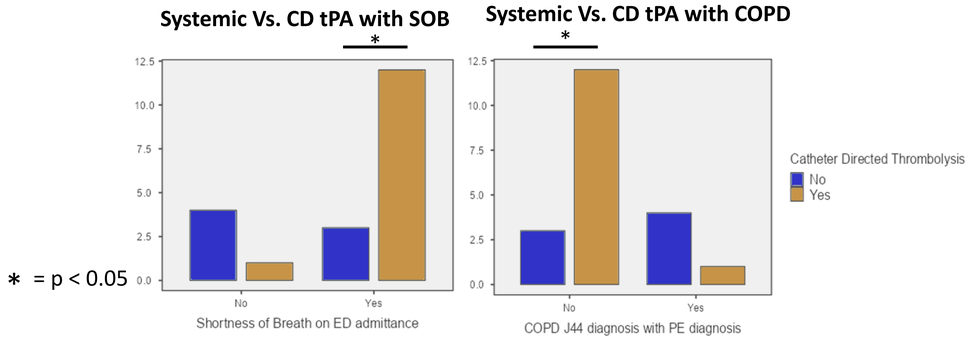


***Figure 3*:** Patients presenting with SOB or COPD and type of tPA administered

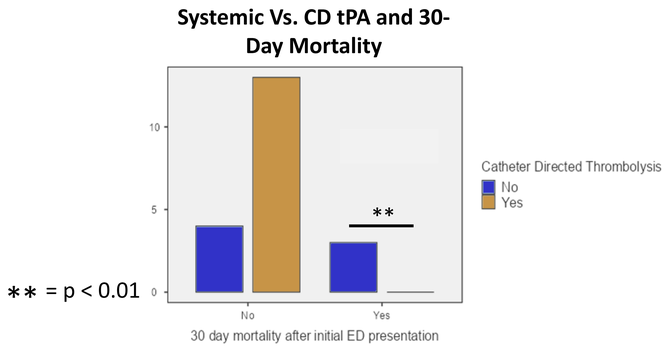


***Figure 4*:** 30-Day Mortality and type of tPA administered

Discussion

- Patients with shortness of breath were more likely to receive catheter directed tPA while patients with COPD were more likely to receive systemic tPA
- Patients who received systemic tPA were more likely to experience 30-Day mortality
- Unstable patients who cannot be transferred to a catheterization laboratory receive systemic tPA in the emergency department, and the findings of this study suggest that this is associated with a poorer prognosis.

Limitations

- Data from patients that are readmitted into other hospitals is not available.
- Lack of follow up with patients that leave the hospital and do not represent (likely leads to a higher 30-day mortality then actually present).
- Data on past medical history reported from patients may be inaccurate due to patient being a poor historian (altered mental status, dementia, intoxicated, or unconscious).
- Small sample size

Conclusion

- Patients who receive systemic tPA are in a more critical condition
- Increase coverage of IR in hospitals could reduce mortality
- The combined effect of a massive PE and COPD causes patients to be in a more critical state; patients are too unstable to be taken to a catheterization lab

Future Directions

- Conduct further prospective analysis of patients receiving Systemic vs CD tPA

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