

Mortality and Clinical Outcomes in Pulmonary Embolism Patients With and Without Atrial Fibrillation: A Propensity-Matched Analysis Using the TriNetX Research Network

Ekow Arhin Essien MD, Abena Agyekum MD, Karlidon Nwaezeapu MD, Abraham Kyei Carboo MD, Justice Owusu-Achiaw MD
Advocate Aurora Health Care, SUNY Downstate Health Sciences University, Trinity Health Ann Arbor, Yale-Waterbury Internal Medicine, 37 Military Hospital
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Background

Pulmonary embolism (PE) remains a significant cause of cardiovascular morbidity and mortality. Atrial fibrillation (AF) frequently coexists with PE, but its impact on mortality and clinical outcomes in PE patients is not well characterized.

Objective

To determine whether concurrent AF is associated with increased mortality, cardiovascular complications, respiratory failure, and healthcare resource utilization in patients with PE.

Methods

- Design:** Retrospective cohort study using TriNetX Research Network
- Population:** PE patients aged 18-90 years with and without concurrent AF
- Analysis:** Propensity score matching for demographics and comorbidities
- Sample:** 181,723 patients in each cohort
- Follow-up:** Five years
- Primary outcome:** All-cause mortality
- Secondary outcomes:** Cardiovascular complications, respiratory failure, healthcare utilization
- Statistical methods:** Cox proportional hazards models, Kaplan-Meier survival analysis

Primary Outcome

Group	All-cause mortality
PE with AF:	32.0%
PE without AF:	26.5%
Hazard Ratio:	1.22
95% CI:	1.21-1.24
p-value:	<0.001



Secondary Outcomes

Significantly increased risks with AF (all p<0.001):

Cardiogenic Shock HR 3.64 (2.2% vs 0.6%)	Heart Failure HR 2.12 (20.0% vs 9.8%)
Ventricular Tachycardia HR 3.26 (4.3% vs 1.4%)	Ventricular Fibrillation HR 4.44 (0.8% vs 0.2%)
Acute Respiratory Failure HR 1.45 (16.1% vs 10.8%)	Increased Hospital LOS HR 1.24 (5.0% vs 4.1%)

Advanced Interventions Required:

- Pacemaker implantation (HR 5.38; 3.3% vs 0.6%)
- ECMO support (HR 4.67; 0.4% vs 0.1%)

Conclusion

Among PE patients, concomitant AF is associated with significantly higher all-cause mortality, increased risk of cardiovascular and respiratory complications, and greater need for advanced interventions.

Clinical Implications: AF identifies a high-risk PE population that may benefit from more intensive monitoring and management strategies.

Strengths and Limitations

Strengths:

- Large sample size (363,446 patients)
- Propensity score matching
- Comprehensive outcome assessment
- Multi-institutional database

Limitations:

- Retrospective design
- Potential residual confounding
- Medication adherence unknown
- PE severity stratification limited

Future Directions

These findings warrant prospective studies to validate risk stratification tools and develop targeted management protocols for PE patients with concurrent AF.