Pulmonary Embolism Outcomes in Heart Failure with Reduced versus Preserved Ejection Fraction: A Propensity-Matched Analysis Using the TriNetX Research Network

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Background

Heart failure complicates the management of pulmonary embolism, but limited data exist on how different heart failure phenotypes influence PE outcomes.

This study sought to characterize mortality and cardiovascular outcomes in PE patients with HFrEF compared to HFpEF.

Objective

To compare clinical outcomes among patients with pulmonary embolism (PE) based on heart failure phenotype: reduced ejection fraction (HFrEF) versus preserved ejection fraction (HFpEF).

Methods

- **Design:** Retrospective cohort study using TriNetX Research Network
- **Population:** Propensity-matched cohorts of PE patients with HFrEF (EF≤40%) vs HFpEF (EF≥50%)
- **Sample:** 8,524 patients in each cohort after matching
- **Primary outcome:** All-cause mortality
- **Secondary outcomes:** Cardiogenic shock, arrhythmias, acute kidney injury, cardiovascular interventions
- **Analysis:** Risk and survival analyses over five-year follow-up

Primary Outcome

HFrEF Mortality:	HFpEF Mortality:
40.9%	31.5%

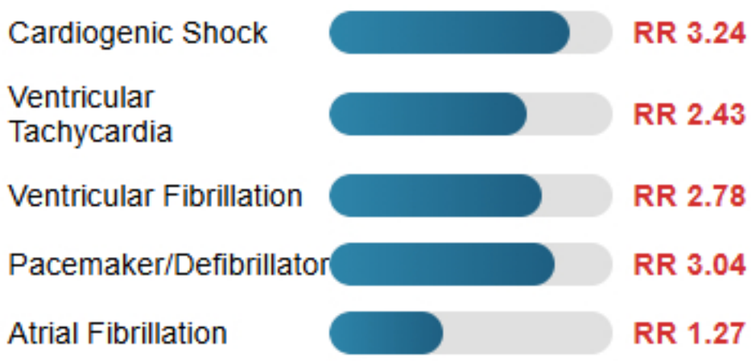
Risk Ratio:

1.30

(95% CI: 1.25-1.36, p<0.001)

30%
Higher Mortality in HFrEF

Secondary Outcomes



Conclusion

Key Finding

Among patients with PE, the HFrEF phenotype is associated with substantially worse outcomes compared to HFpEF, including higher mortality, more frequent arrhythmias, and greater risk of cardiogenic shock.

Clinical Implications: PE patients with HFrEF require particularly close monitoring and aggressive management to mitigate their elevated cardiovascular risk.

Strengths and Limitations

Strengths

- Large sample size (n=17,048)
- Propensity matching
- Comprehensive outcome assessment
- Five-year follow-up period

Limitations

- Retrospective design
- Potential residual confounding
- Database limitations
- Unknown medication adherence