Comparative Outcomes of Catheter-Directed Thrombectomy Versus Catheter-Directed Thrombolysis in Obese Patients with Pulmonary Embolism

Ekow Arhin Essien MD, Karldon Nwaezeapu MD, Abena Agyekum MD, Justice Owusu-Achiaw MD, Edmund Mireku Bediako MD

Advocate Aurora Health Care, Trinity Health Ann Arbor, SUNY Downstate Health Sciences University, 37 Military Hospital, The Shelburne Hospital

Contact: Ekow Essien, MD | ekowe94@gmail.com | Abstract ID: 2127427

Background

Catheter-directed interventions have emerged as treatment options for pulmonary embolism (PE), but comparative effectiveness data in obese populations remain limited.

Objective

To compare clinical outcomes between catheter-directed thrombectomy (CDT) and catheter-directed thrombolysis (CDL) in obese patients with pulmonary embolism.

Methods

- **Design:** Retrospective cohort study using TriNetX Research Network (129 healthcare organizations)
- **Population:** Obese patients (BMI ≥30 kg/m²) with PE prescribed either CDT or CDL
- **Analysis:** Propensity score matching for demographics and comorbidities (935 patients in each cohort)
- **Primary outcome:** All-cause mortality
- **Secondary outcomes:** Cardiac events, arrhythmias, and other clinical outcomes
- **Statistical methods:** Risk analysis, Kaplan-Meier survival analysis, and number of instances analysis over five-year follow-up period

Primary Outcome

All-cause mortality:	
CDT:	22.1%
CDL:	11.5%
Risk Ratio:	1.924
95% CI:	1.550-2.387
p-value:	<0.001

Secondary Outcomes

Significantly higher risks with CDT:

- Ventricular Tachycardia: RR 2.083
- Atrial Fibrillation: RR 1.505
- Cerebrovascular Disease: RR 1.764
- Pacemaker Implantation: RR 2.123

Additional findings with CDT (all p<0.05):

- Heart failure trend (RR 1.355; p=0.053)
- No significant differences: cardiogenic shock, acute kidney injury, myocardial infarction

Results Summary

CDT was associated with significantly higher all-cause mortality compared to CDL (22.1% vs 11.5%, risk ratio [RR] 1.924, 95% CI 1.550-2.387, p<0.001).

92%
Higher Mortality Risk with CDT

CDT-treated patients also had increased risks of:

- Ventricular tachycardia (RR 2.083, 95% CI 1.169-3.712)
- Atrial fibrillation (RR 1.505, 95% CI 1.049-2.158)
- Cerebrovascular disease (RR 1.764, 95% CI 1.226-2.537)
- Pacemaker implantation (RR 2.123, 95% CI 1.069-4.217)

Conclusion

In obese patients with pulmonary embolism, catheter-directed thrombectomy was associated with significantly higher mortality and cardiac arrhythmias compared to catheter-directed thrombolysis.

- **92% higher risk** of all-cause mortality
- **108% higher risk** of ventricular tachycardia
- **51% higher risk** of atrial fibrillation
- **76% higher risk** of cerebrovascular disease
- **112% higher risk** of pacemaker implantation

Clinical Implications: These findings suggest potential cardiovascular advantages of catheter-directed thrombolysis over catheter-directed thrombectomy in this high-risk population.

Strengths and Limitations

Strengths:
- Large sample size
- Propensity matching
- Comprehensive outcome assessment
- Multi-center data

Limitations:
- Retrospective design
- Potential residual confounding
- Treatment selection bias