

Catheter-Directed Thrombectomy in Acute Pulmonary Embolism: Assessment of Safety, Efficacy, and Procedural Learning Curve

Background

Catheter-directed thrombectomy (CDT) has emerged as a promising treatment option for acute pulmonary embolism (PE), with increasing evidence supporting its safety and efficacy. As its clinical use expands, the impact of procedural experience on outcomes remains of interest.

Aim

To evaluate the safety and efficacy of CDT over time and determine whether increasing procedural experience was associated with a learning-curve effect.

Methods

We retrospectively analyzed 99 consecutive patients with acute PE who underwent CDT using the FlowTrier system between 05/2022 and 08/2026 at a single center. Patients were chronologically divided into three equal groups of 33 patients (early, intermediate, and late). Clinical, echocardiographic, and procedural outcomes were compared. Changes in pre- and post-procedural parameters and their interaction with procedural group were assessed. Additional analyses compared the first 5 and first 10 procedures with subsequent cases.

Results

Heart rate and respiratory rate decreased significantly following thrombectomy (both $p < 0.001$), with no significant difference in the magnitude of reduction between groups ($p = 0.184$ and $p = 0.464$, respectively). Similarly, sPAP and RV/LV ratio decreased significantly after intervention (both $p < 0.001$), without significant differences in the magnitude of change across groups ($p = 0.110$ and $p = 0.524$, respectively). Mortality occurred in 4, 2, and 3 patients in the early, intermediate, and late groups, respectively ($p = 0.695$). Bleeding occurred in 3, 5, and 4 patients, respectively ($p = 0.752$). Contrast volume and fluoroscopy time did not differ significantly between groups ($p = 0.475$ and $p = 0.490$, respectively). Comparisons of the first 5 and 10 procedures with subsequent cases revealed no significant differences in ICU stay, bleeding, mortality, fluoroscopy time, or contrast volume.

Conclusion

In this single-center cohort, CDT demonstrated consistent clinical and echocardiographic effectiveness and a stable safety profile over time. No significant learning-curve effect was observed with increasing procedural experience.