Catheter Directed Thrombolysis Versus Systemic Thrombolysis for the Treatment of Pulmonary Embolism

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Introduction

• Pulmonary embolism (PE) is the third leading cardiovascular cause of death after myocardial infarction and stroke in the United States, accounting for nearly 100,000 deaths each year

• Catheter-directed thrombolysis (CDT) and systemic thrombolysis (ST) are both used to treat intermediate and high-risk PEs, although comparative safety and effectiveness data is lacking

• We performed a comparative analysis of CDT versus ST in the treatment of pulmonary embolism using a large administrative database

Methods

Utilizing a large private-payer claims database (OptumInsight Clinformatics Datamart), we identified a cohort of PE patients receiving CDT and ST (Figure 1). We extracted demographic characteristics, high risk PE features, components of the Elixhauser Comorbidity Index, and outcomes including intracranial hemorrhage (ICH), all-cause bleeding, and mortality among patients receiving CDT and ST. We used propensity score methods to compare outcomes between matched cohorts adjusted for observed confounders.

Results

We identified 100,744 admissions for PE of which 1,915 patients (1.9%) received either CDT (n=632) or ST (n=1283). The mean age in the CDT group was 57.3 years (± 16.3 years) and 57.5 years (± 16.6 years) in the ST group (Table 1).

Patients in the CDT group had fewer high-risk features including less shock and cardiac arrest (Table 2). In 1:1 propensity matched groups, ICH rates were 1.9% in both the CDT and ST groups (p=1.0) (Table 3). All-cause bleeding was higher in the CDT group (16.0 vs. 8.7%; p<0.001), while in hospital mortality was lower (6.5 vs. 10.0%; p=0.02).

The number of PE hospitalizations per year increased from 3,225 to 13,096 (p<0.001) from 2004 to 2014. The annual number of patients receiving CDT increased from 39 to 115 (p=0.001), while the annual number of patients receiving ST increased from 40 to 215 (p<0.001) (Figure 2).

Uncertainty about the safety and clinical effectiveness of CDT in real-world practice suggests the need for large-scale randomized clinical trials before its implementation in routine clinical practice.

Discussion

We observed a higher incidence of all-cause bleeding associated with CDT and no difference in ICH between CDT and ST. These data raise concerns regarding the notion that CDT circumvents the bleeding and ICH risks associated with ST in PE patients. Mortality differences must be viewed with circumspection due to the higher baseline risk of the ST cohort.

References


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