



## The 65th ASH Annual Meeting Abstracts

## POSTER ABSTRACTS

## 332. THROMBOSIS AND ANTICOAGULATION: CLINICAL AND EPIDEMIOLOGICAL

**Fatal Pulmonary Embolism, Fatal Bleeding and Intracranial Hemorrhage with Systemic and Catheter-Directed Thrombolysis in Intermediate-High and High-Risk Pulmonary Embolism: A Systematic Review with Meta-Analysis**

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**Background:** Thrombolysis, either systemic (ST) or catheter-directed (CDT), may reduce mortality in patients with intermediate-high and high-risk pulmonary embolism (PE), but with an increased risk of major bleeding (MB). Moreover, uncertainties remain for other efficacy and safety outcomes, such as fatal PE, fatal bleeding, and intracranial hemorrhage (ICH).

**Aims:** To evaluate fatal PE, fatal bleeding and ICH with ST and CDT in patients with intermediate-high and high-risk PE.

**Methods:** We performed a systematic search in MEDLINE, EMBASE and Cochrane from inception to December 2022. Randomized trials and cohort/observational studies of patients with intermediate-high and high-risk PE were included. We report fatal PE, fatal bleeding and ICH; mortality and MB have been previously reported. Pooled proportions with their 95% confidence interval (CI) were calculated for each treatment group.

**Results:** One hundred and fifty-eight studies (87,874 patients) were included. In patients treated with ST, 30-day mortality and MB occurred in 10.4% (95%CI 6.6%-14.8%;  $I^2=99%$ ) and in 8.0% (95%CI 5.8%-10.5%;  $I^2=96%$ ), respectively. Fatal PE occurred in 3.9% (95%CI 2.1%-6.3%;  $I^2=88%$ ), fatal bleeding in 1.7% (95%CI 1.3%-2.3%;  $I^2=8%$ ) and ICH in 1.6% (95%CI 1.3%-1.9%;  $I^2=17%$ ). In patients treated with CDT, 30-day mortality and MB occurred in 5.3% (95%CI 3.6%-7.3%;  $I^2=93%$ ) and in 5.4% (95%CI 3.8%-7.2%;  $I^2=87%$ ), respectively. Fatal PE occurred in 1.5% (95%CI 1.0%-2.0%;  $I^2=2%$ ), fatal bleeding in 1.2% (95%CI 0.8%-1.6%;  $I^2=0%$ ) and ICH in 0.6% (95%CI 0.4%-0.9%;  $I^2=7%$ ). In patients treated with anticoagulation alone, 30-day mortality and MB occurred in 9.9% (95%CI 7.1%-13.1%;  $I^2=97%$ ) and in 3.8% (95%CI 2.6%-5.4%;  $I^2=66%$ ), respectively. Fatal PE occurred in 3.3% (95%CI 1.9%-5.2%;  $I^2=65%$ ), fatal bleeding in 0.5% (95%CI 0.2%-0.9%;  $I^2=0%$ ) and ICH in 0.7% (95%CI 0.3%-1.3%;  $I^2=64%$ ).

**Conclusion:** In patients with intermediate-high and high-risk PE, fatal PE was non-negligible in all treatment modalities and must be balanced with equally important fatal bleeding event rates. Additional studies are needed to further assess these efficacy and safety parameters of thrombolytics in patients with intermediate-high and high risk PE.

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**Table 1. Efficacy and safety outcomes per treatment group.**

Type of treatment	Pooled proportions % (95%CI)	I <sup>2</sup> (%)
<b>Systemic thrombolysis</b>		
Mortality	10.4 (6.6-14.8)	99
Major bleeding	8.0 (5.8-10.5)	96
Fatal pulmonary embolism	3.9 (2.1-6.3)	88
Fatal bleeding	1.7 (1.3-2.3)	8
Intracranial hemorrhage	1.6 (1.3-1.9)	17
<b>Catheter-directed thrombolysis</b>		
Mortality	5.3 (3.6-7.3)	93
Major bleeding	5.4 (3.8-7.2)	87
Fatal pulmonary embolism	1.5 (1.0-2.0)	2
Fatal bleeding	1.2 (0.8-1.6)	0
Intracranial hemorrhage	0.6 (0.4-0.9)	7
<b>Anticoagulation alone</b>		
Mortality	9.9 (7.1-13.1)	97
Major bleeding	3.8 (2.5-5.4)	66
Fatal pulmonary embolism	3.3 (1.9-5.2)	65
Fatal bleeding	0.5 (0.2-0.9)	0
Intracranial hemorrhage	0.7 (0.3-1.3)	64

**Figure 1**

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