Review question / Objective: To compare efficacy and safety of standard and ultrasound-assisted thrombolysis for pulmonary embolism

Condition being studied: Patient admitted for pulmonary embolism who received treatment with ultrasound-assisted thrombolysis or standard catheter-directed thrombolysis.

Eligibility criteria: All included trials had to include at least 1 USAT treatment arm and 1 SCDT. The target population was adults with acute PE. Single-armed follow-up studies, case series, and case reports are excluded.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 14 April 2022 and was last updated on 14 April 2022 (registration number INPLASY202240082).
**Condition being studied:** Patient admitted for pulmonary embolism who received treatment with ultrasound-assisted thrombolysis or standard catheter-directed thrombolysis.

**METHODS**

**Participant or population:** Patients with pulmonary embolism.

**Intervention:** Ultrasound-assisted thrombolysis (USAT).

**Comparator:** Standard Catheter-directed thrombolysis (SCDT).

**Study designs to be included:** Randomized-controlled trial and observational trials are included.

**Eligibility criteria:** All included trials had to include at least 1 USAT treatment arm and 1 SCDT. The target population was adults with acute PE. Single-armed follow-up studies, case series, and case reports are excluded.

**Information sources:** PubMed and Embase database

**Main outcome(s):** Mortality, PA pressure change post treatment, RV/LV ratio, bleeding

**Quality assessment / Risk of bias analysis:** All eligible trials were evaluated by 2 reviewers independently using Jadad scoring for RCTs and the Newcastle-Ottawa quality assessment scale for comparative trials.

**Strategy of data synthesis:** The standardized mean difference (SMD) with a 95% CI was calculated for continuous outcome variables. The odds ratio was calculated for categorical outcome variables, which included the major bleeding event rates and in-hospital mortality and 30-day mortality. A random effects model was used to pool individual SMDs and ORs; all analyses were performed using Comprehensive Meta-Analysis software (version 3; Biostat, Englewood, NJ, USA). Between-trial heterogeneity was determined by using I² tests, with values >50% considered to indicate significant heterogeneity. Funnel plots and the Egger test were used to determine potential publication bias. Statistical significance was defined as a p value < 0.05; however, for publication bias, p < 0.10 was considered to indicate statistical significance.

**Subgroup analysis:** Massive pulmonary embolism v.s submassive pulmonary embolism.

**Sensitivity analysis:** Nil.

**Language:** English.

**Country(ies) involved:** Taiwan.

**Keywords:** pulmonary embolism, ultrasound-assisted thrombolysis, EKOS, catheter-directed thrombolysis.

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