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ORIGINAL ARTICLE

# Comparative analysis of safety and efficacy of different advanced therapeutic strategies for acute pulmonary embolism: A Bayesian network meta-analysis

**Supplementary Files**

## Search result

Pulmonary embolism therapies

Search key: ((acute pulmonary embolism) AND ((intermediate-risk pulmonary embolism) OR (high-risk pulmonary embolism))) AND ((catheter-directed therapy) OR (catheter-directed thrombectomy) OR (catheter-directed thrombolysis) OR (ultrasound-assisted catheter-directed thrombolysis) OR (mechanical thrombectomy) OR (large-bore mechanical thrombectomy) OR (systemic anticoagulation) OR (systemic thrombolysis))

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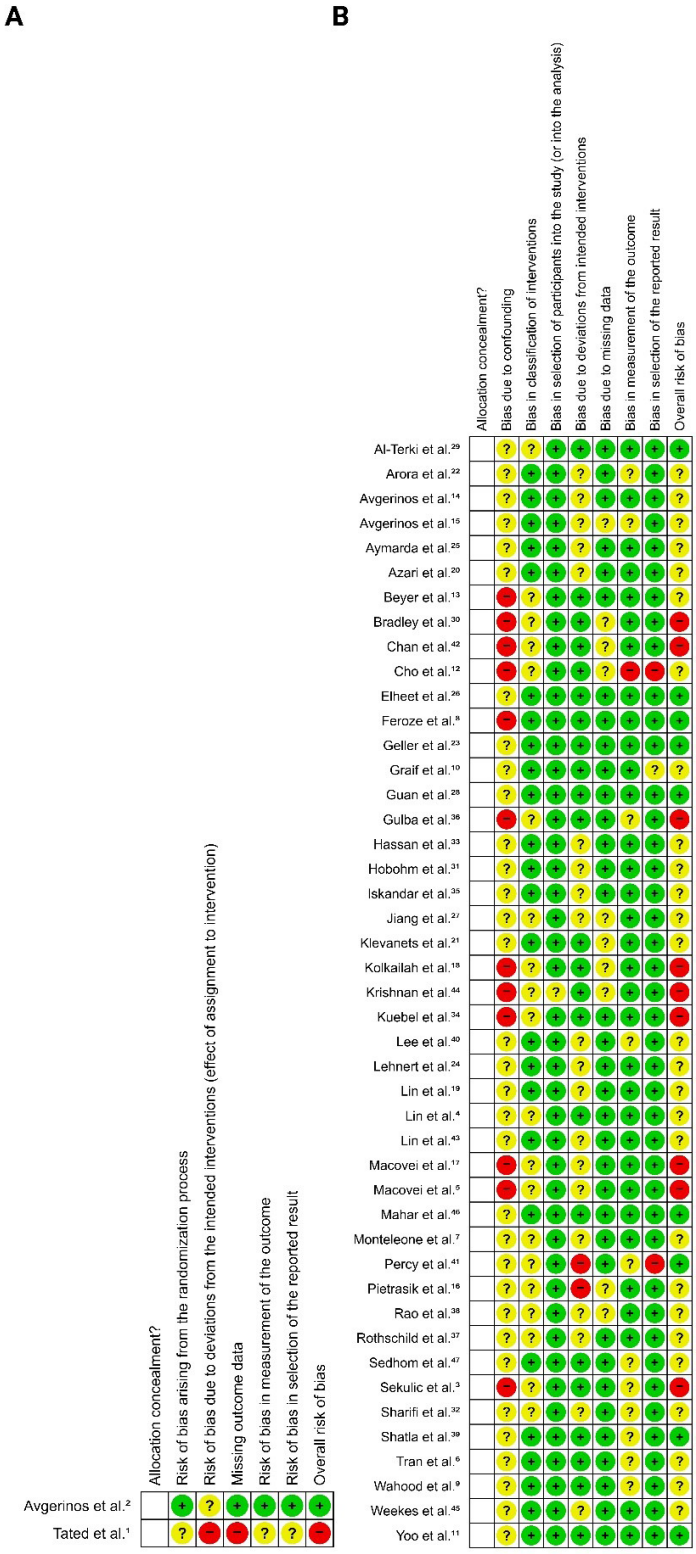


**Figure S1.** Risk of bias of the included studies: (A) For randomized controlled trials; (B) Non-randomized studies

| Comparison | Number of Studies | Within-study bias | Reporting bias | Indirectness | Imprecision | Heterogeneity | Incoherence | Confidence rating | Reason(s) for downgrading |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Mixed evidence | | | | | |
| CBE vs SE | 3 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |
| CBE vs ST | 5 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |
| CBE vs USAT | 6 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |
| CBE vs sCDT | 4 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |
| SE vs ST | 10 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |
| SE vs USAT | 1 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |
| SE vs sCDT | 5 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |
| ST vs USAT | 9 | No concerns | Some concerns | No concerns | No concerns | Major concerns | Major concerns | Low | \| Reporting bias \| Heterogeneity \| Incoherence \| |
| ST vs sCDT | 18 | No concerns | Some concerns | No concerns | No concerns | Major concerns | No concerns | Moderate | \| Reporting bias \| Heterogeneity \| |
| USAT vs sCDT | 7 | No concerns | Some concerns | No concerns | Major concerns | No concerns | No concerns | Moderate | \| Reporting bias \| Imprecision \| |

**Figure S2.** The evidence from the short-term mortality analysis was assessed using the Confidence in Network Meta-Analysis approach. The Confidence in Network Meta-Analysis considers the following domains: within-study bias, reporting bias, indirectness, imprecision, heterogeneity, and incoherence. Both direct and indirect evidence are represented separately

Abbreviations: CBE: Catheter-based embolectomy; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; USAT: Ultrasound-assisted thrombolysis.

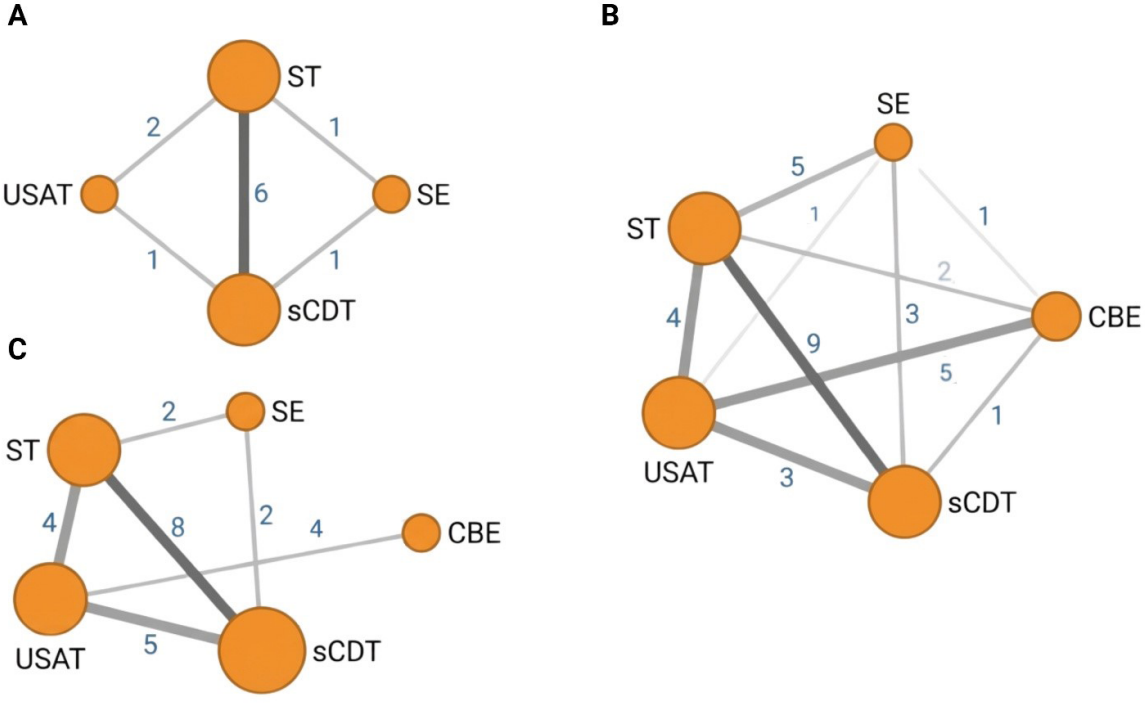


**Figure S3.** Network meta-analysis plot for included interventions: (A) For GI bleeding, (B) For Intracranial hemorrhage, (C) For blood transfusion Abbreviations: CBE: Catheter-based embolectomy; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; USAT: Ultrasound-assisted thrombolysis.

**Table S1. Baseline co-morbidities present among patients in studies included in the network meta-analysis analysis**

| Study, publication year | Interventions, *n* | Co-morbidities, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diabetes mellitus | HTN | Obesity | CAD | HLD | Arrhythmia | CHF | Pulmonary disease | Liver disease | Renal dysfunction |
| Tated *et al.* 2021[1] | sCDT, *n* = 25 | 5 (20) | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 25 | 6 (24) | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Avgerinos *et al.*, 2021[2] | USAT, *n* = 40 | NA | 15 (38) | NA | 4 (10) | NA | NA | 1 (3) | 3 (8) | NA | NA |
| | sCDT, *n* = 41 | NA | 19 (46) | NA | 5 (12) | NA | NA | 1 (2) | 3 (7) | NA | NA |
| Sekulic *et al.* 2020[3] | ST, *n* = 91 | 73 (80) | NA | NA | 11 (12) | NA | NA | 82 (90) | 83 (91) | NA | NA |
| | USAT, *n* = 24 | 22 (92) | NA | NA | 2 (8) | NA | NA | 22 (92) | 23 (96) | NA | NA |
| Lin *et al.* 2009[4] | USAT, *n* = 11 | NA | NA | 2 (18) | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 14 | NA | NA | 1 (7) | NA | NA | NA | NA | NA | NA | NA |
| Macovei *et al.* 2020[5] | sCDT, *n* = 37 | NA | NA | 22 (59.5) | NA | NA | NA | 10 (27) | NA | NA | NA |
| | ST, *n* = 36 | NA | NA | 17 (47.2) | NA | NA | NA | 4 (11.1) | NA | NA | NA |
| Tran *et al.* 2023[6] | USAT, *n* = 226 | 43 (19) | 107 (47) | NA | 16 (7) | NA | NA | 10 (4) | 46 (20) | NA | 34 (15) |
| | CBE, *n* = 146 | 30 (21) | 81 (55) | NA | 11 (8) | NA | NA | 11 (8) | 21 (14) | NA | 17 (12) |
| Monteleone *et al.*, 2024[7] | USAT, *n* = 1,577 | 283 (17.9) | 704 (44.6) | NA | 167 (10.6) | NA | NA | NA | 99 (6.3) | NA | 138 (8.8) |
| | CBE, *n* = 682 | 118 (17.3) | 307 (45.0) | NA | 74 (10.9) | NA | NA | NA | 37 (5.4) | NA | 59 (8.7) |
| Feroze *et al.* 2023[8] | CBE, *n* = 97 | NA | 72 (74.2) | NA | 96 (99) | 56 (57.7) | NA | NA | 33 (34.0) | NA | NA |
| | USAT, *n* = 97 | NA | 35 (70) | NA | 49 (98) | 26 (52) | NA | NA | 13 (26) | NA | NA |
| Wahood *et al.* 2023[9] | sCDT, *n* = 18,702 | 5,336 (28.54) | NA | 7,425 (39.70) | NA | NA | NA | 3,336 (17.84) | 3,958 (21.16) | NA | 1,990 (10.64) |
| | ST, *n* = 18,414 | 4,691 (25.47) | NA | 6,214 (33.75) | NA | NA | NA | 3,047 (16.55) | 3,725 (20.23) | NA | 2,088 (11.34) |
| Graif *et al.* 2020[10] | sCDT, *n* = 26 | 7 (26.9) | 13 (50) | 11 (42.3) | NA | 8 (30.8) | NA | 4 (15.4) | 7 (26.9) | NA | NA |
| | CBE, *n* = 26 | 5 (19.2) | 16 (61.5) | 19 (73.1) | NA | 11 (42.3) | NA | 3 (11.5) | 3 (11.5) | NA | NA |
| Yoo *et al.* 2016[11] | ST, *n* = 44 | 6 (13.6) | 17 (38.6) | NA | NA | NA | NA | NA | NA | NA | 8 (18.2) |
| | sCDT, *n* = 28 | 4 (14.3) | 11 (39.3) | NA | NA | NA | NA | NA | NA | NA | 5 (17.9) |
| Cho *et al.* 2015[12] | ST, *n* = 19 | 0 | 9 (47) | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 26 | 9 (35) | 12 (46) | NA | NA | NA | NA | NA | NA | NA | NA |
| Beyer *et al.* 2020[13] | USAT, *n* = 417 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 1,643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 3,376 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

(*Cont'd...*)





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**Table S1.** (*Continued*)

| Study, publication year | Interventions, *n* | Co-morbidities, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diabetes mellitus | HTN | Obesity | CAD | HLD | Arrhythmia | CHF | Pulmonary disease | Liver disease | Renal dysfunction |
| Avgerinos *et al.* 2019[14] | USAT, *n* = 54 | NA | NA | NA | NA | NA | NA | NA | 10 (18.5) | NA | NA |
| | ST, *n* = 18 | NA | NA | NA | NA | NA | NA | NA | 3 (16.7) | NA | NA |
| Avgerinos *et al.* 2018[15] | USAT, *n* = 213 | NA | 116 (54.7) | NA | 29 (13.5) | NA | NA | 11 (5.2) | 47 (22.3) | NA | NA |
| | ST, *n* = 104 | NA | 41 (39.4) | NA | 11 (11.0) | NA | NA | 7 (6.7) | 14 (13.5) | NA | NA |
| Pietrasik *et al.* 2024[16] | ST, *n* = 11 | 3 (27.3) | 4 (36.4) | NA | 0 (0) | NA | 0 (0) | 1 (9.1) | 0 (0) | NA | 1 (9.1) |
| | SE, *n* = 15 | 4 (26.7) | 7 (46.7) | NA | 2 (13.3) | NA | 0 (0) | 2 (13.3) | 0 (0) | NA | 1 (6.7) |
| | sCDT, *n* = 4 | 5 (29.4) | 11 (64.7) | NA | 2 (11.8) | NA | 1 (5.9) | 0 (0) | 1 (5.9) | NA | 3 (17.6) |
| | CBE, *n* = 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Macovei *et al.* 2015[17] | sCDT, *n* = 28 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 24 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Kolkailah *et al.* 2016[18] | USAT, *n* = 62 | 10 (16.1) | 33 (53.2) | NA | 6 (9.7) | 27 (43.5) | NA | 2 (3.2) | 6 (9.7) | NA | 4 (6.5) |
| | SE, *n* = 71 | 8 (11.3) | 35 (49.3) | NA | 7 (9.9) | 20 (28.2) | NA | 24 (33.8) | 5 (7) | NA | 4 (5.6) |
| Lin *et al.* 2021[19] | sCDT, *n* = 145 | 32 (22.1) | 70 (48.3) | NA | 37 (25.5) | 28 (19.3) | 6 (4.1) | 9 (6.2) | 11 (7.6) | 16 (11.0) | 25 (17.2) |
| | ST, *n* = 1,158 | 299 (25.8) | 593 (51.2) | NA | 296 (25.6) | 236 (20.4) | 79 (6.8) | 114 (9.8) | 161 (13.9) | 140 (12.1) | 196 (16.9) |
| Azari *et al.* 2015[20] | SE, *n* = 30 | 13 (43.33) | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 78 | 22 (28.21) | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Klevanets *et al.* 2017[21] | ST, *n* = 102 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 107 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Arora *et al.* 2017[22] | ST, *n* = 2,256 | 558 (24.73) | 1,287 (57.05) | 745 (33.02) | NA | NA | NA | 380 (16.84) | 401 (17.77) | NA | 202 (8.95) |
| | sCDT, *n* = 1,128 | 253 (22.43) | 641 (56.83) | 383 (33.95) | NA | NA | NA | 161 (14.27) | 211 (18.71) | NA | 94 (8.33) |
| Geller *et al.* 2020[23] | sCDT, *n* = 629 | 184 (29.2) | 417 (66.3) | 186 (29.6) | NA | NA | NA | 118 (18.8) | 183 (29.1) | 36 (5.7) | 57 (9.1) |
| | ST, *n* = 629 | 178 (28.3) | 409 (65.0) | 186 (29.6) | NA | NA | NA | 128 (20.3) | 180 (28.6) | 35 (5.6) | 53 (8.4) |
| Lehnert *et al.* 2016[24] | SE, *n* = 50 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 86 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Aymarda *et al.* 2013[25] | SE, *n* = 28 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 52 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Elheet *et al.* 2024[26] | sCDT, *n* = 58 | 13 (22.4) | 37 (63.8) | NA | NA | NA | NA | 5 (8.6) | NA | NA | 8 (13.8) |
| | USAT, *n* = 77 | 16 (20.8) | 45 (58.4) | NA | NA | NA | NA | 8 (10.4) | NA | NA | 9 (11.7) |

(*Cont'd...*)





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**Table S1.** *(Continued)*

| Study, publication year | Interventions, *n* | Co-morbidities, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diabetes mellitus | HTN | Obesity | CAD | HLD | Arrhythmia | CHF | Pulmonary disease | Liver disease | Renal dysfunction |
| Jiang *et al.* 2020[27] | ST, *n* = 52 | NA | NA | NA | NA | NA | NA | 1 (1.79) | 5 (8.93) | NA | NA |
| | USAT, *n* = 47 | NA | NA | NA | NA | NA | NA | 3 (6.39) | 3 (6.39) | NA | NA |
| Guan *et al.* 2023[28] | ST, *n* = 37 | NA | NA | 12 (32.43) | NA | 17 (45.95) | NA | NA | NA | NA | NA |
| | sCDT, *n* = 37 | NA | NA | 11 (29.73) | NA | 21 (56.76) | NA | NA | NA | NA | NA |
| Al-Terki *et al.*, 2024[29] | USAT, *n* = 69 | NA | NA | 26 (38) | NA | NA | NA | 6 (9) | 14 (20) | NA | NA |
| | CBE, *n* = 26 | NA | NA | 13 (50) | NA | NA | NA | 5 (19) | 1 (4) | NA | NA |
| Bradley *et al.* 2021[30] | sCDT, *n* = 21 | 4 (19.1) | 13 (61.9) | NA | NA | NA | 1 (4.8) | NA | NA | 1 (4.8) | 2 (9.5) |
| | ST, *n* = 21 | 6 (28.6) | 13 (61.9) | NA | NA | NA | 0 | NA | NA | 2 (9.5) | 1 (4.8) |
| Hobohm *et al.* 2020[31] | sCDT, *n* = 1,175 | 211 (18.0) | 504 (42.9) | 178 (15.1) | 188 (16.0) | NA | NA | 279 (23.7) | 67 (5.7) | NA | 70 (6.0) |
| | ST, *n* = 40,728 | 8,663 (21.3) | 16,048 (39.4) | 5,754 (13.7) | 5,141 (12.6) | NA | NA | 11,912 (29.2) | 3279 (8.1) | NA | 3,120 (7.7) |
| Sharifi *et al.* 2019[32] | USAT, *n* = 47 | 7 (15) | 22 (47) | NA | NA | 17 (36) | NA | NA | NA | NA | NA |
| | ST, *n* = 50 | 10 (20) | 26 (52) | NA | NA | 20 (40) | NA | NA | NA | NA | NA |
| Hassan *et al.* 2021[33] | CBE, *n* = 25 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 25 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Kuebel *et al.* 2023[34] | USAT, *n* = 105 | NA | NA | NA | NA | NA | NA | 5 (4.8) | 16 (15.2) | NA | NA |
| | ST, *n* = 105 | NA | NA | NA | NA | NA | NA | 13 (12.4) | 26 (24.8) | NA | NA |
| Iskandar *et al.* 2022[35] | USAT, *n* = 47 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 17 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 71 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Gulba *et al.* 1994[36] | SE, *n* = 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 24 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Rothschild *et al.* 2019[37] | sCDT, *n* = 36 | 11 (30.6) | 25 (69.4) | 22 (61.1) | NA | NA | NA | 1 (2.8) | 5 (13.9) | NA | NA |
| | USAT, *n* = 62 | (17.7) | (58.1) | (74.2) | NA | NA | NA | 0 | (21.0) | NA | NA |
| Rao *et al.* 2019[38] | sCDT, *n* = 33 | 6 (18.2) | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | USAT, *n* = 37 | 8 (21.6) | NA | NA | NA | NA | NA | NA | NA | NA | NA |

(*Cont'd...*)





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**Table S1.** *(Continued)*

| Study, publication year | Interventions, *n* | Co-morbidities, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diabetes mellitus | HTN | Obesity | CAD | HLD | Arrhythmia | CHF | Pulmonary disease | Liver disease | Renal dysfunction |
| Shatla *et al.* 2024[39] | sCDT, *n* = 26,710 | 3,180 (11.9) | 16,765 (62.8) | 10,885 (40.8) | 3,070 (11.5) | NA | 6,390 (23.9) | 4,595 (17.20) | 5,250 (19.7) | 1,310 (4.9) | 140 (0.5) |
| | USAT, *n* = 8,060 | 1,020 (12.7) | 5,180 (64.3) | 3,375 (41.9) | 1,070 (13.3) | NA | 1,960 (24.3) | 1,320 (16.4) | 1,545 (19.2) | 300 (3.7) | 40 (0.5) |
| Lee *et al.* 2017[40] | ST, *n* = 1,854 | 407 (22) | 1,020 (55) | NA | 320 (17) | 535 (29) | 181 (10) | 350 (19) | 363 (20) | NA | 148 (8) |
| | SE, *n* = 257 | 46 (18) | 138 (54) | NA | 57 (22) | 81 (32) | 28 (11) | 79 (31) | 49 (19) | NA | 19 (7) |
| Percy *et al.* 2020[41] | ST, *n* = 33,553 | 6,456 (19.2) | 17,188 (51.2) | 8,785 (26.2) | 4,155 (12.4) | 9,133 (27.2) | 4,043 (12.1) | 4,514 (13.5) | 6,195 (18.5) | NA | NA |
| | sCDT, *n* = 22,336 | 4,125 (18.5) | 12,121 (54.3) | 5,267 (23.6) | 3579 (16.0) | 7,211 (32.3) | 2,951 (13.2) | 2,976 (13.3) | 4,724 (21.2) | NA | NA |
| | SE, *n* = 3,085 | 567 (18.4) | 1,413 (45.8) | 805 (26.1) | 437 (14.2) | 775 (25.1) | 667 (21.6) | 550 (17.8) | 427 (13.8) | NA | NA |
| Chan *et al.* 2023[42] | CBE, *n* = 14 | 2 (14.3) | 6 (42.9) | NA | NA | NA | NA | NA | NA | NA | NA |
| | USAT, *n* = 14 | 3 (21.4) | 4 (28.6) | NA | NA | NA | NA | NA | NA | NA | NA |
| Lin *et al.* 2022[43] | sCDT, *n* = 169 | 43 (25.4) | 82 (48.5) | NA | 4 (2.4) | 32 (18.9) | 5 (3.0) | 13 (7.7) | 13 (7.7) | 19 (11.2) | 29 (17.2) |
| | SE, *n* = 220 | 51 (23.2) | 124 (56.4) | NA | 3 (1.4) | 49 (22.3) | 20 (9.1) | 37 (16.8) | 32 (14.5) | 29 (13.2) | 34 (15.5) |
| Krishnan *et al.* 2022[44] | sCDT, *n* = 2,460 | 190 (7.7) | 940 (38.2) | 428 (17.4) | NA | NA | NA | 238 (9.7) | 452 (18.4) | 131 (5.3) | 386 (15.7) |
| | ST, *n* = 1,340 | 149 (11.1) | 539 (40.2) | 175 (13.1) | NA | NA | NA | 115 (8.6) | 242 (18.1) | 126 (9.4) | 130 (9.7) |
| Weekes *et al.* 2024[45] | USAT, *n* = 145 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 154 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Mahar *et al.* 2018[46] | sCDT, *n* = 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Sedhom *et al.* 2022[47] | ST, *n* = 3,570 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 30,395 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 8,089 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 2,185 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Note: NA: Not available.

Abbreviations: CAD: Coronary artery disease; CBE: Catheter-based embolectomy; CHF: Congestive heart failure; HLD: Hyperlipidemia; HTN: Hypertension; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; USAT: Ultrasound-assisted thrombolysis.





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**Table S2. Baseline predisposing factors present among the included patients in the studies included in the network meta-analysis analysis**

| Study, publication year | Interventions, *n* | Predisposing factors for pulmonary embolism, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Recent surgery | Recent trauma | Previous stroke | Recent immobilization | Malignancy | Hypercoagulable state | DVT | Prior pulmonary embolism | Smoking | Contraceptive use |
| Tated *et al.* 2021[1] | sCDT, *n* = 25 | 5 (20) | 16 (64) | NA | 3 (12) | 0 | NA | 11 (44) | 2 (8) | | |
| | ST, *n* = 25 | 1 (4) | 14 (56) | NA | 3 (12) | 0 | NA | 5 (20) | 0 | | |
| Avgerinos *et al.*, 2021[2] | USAT, *n* = 40 | NA | NA | NA | NA | 2 (5) | 2 (5) | 3 (8) | 5 (13) | 7 (18) | 4 (10) |
| | sCDT, *n* = 41 | NA | NA | NA | NA | 2 (5) | 0 | 9 (22) | 4 (10) | 11 (27) | 3 (7) |
| Sekulic *et al.* 2020[3] | ST, *n* = 91 | NA | NA | 87 (96) | NA | 82 (90) | NA | 43 (48) | NA | 13 (15) | NA |
| | USAT, *n* = 24 | NA | NA | 21 (88) | NA | 22 (92) | NA | 14 (58) | NA | 7 (32) | NA |
| Lin *et al.* 2009[4] | USAT, *n* = 11 | NA | 0 | NA | 1 (9) | 1(9) | 3 (27) | 0 | NA | 4 (36) | NA |
| | sCDT, *n* = 14 | NA | 1 (7) | NA | 3 (21) | 2 (14) | 1(7) | 1 (7) | NA | 2 (14) | NA |
| Macovei *et al.* 2020[5] | sCDT, *n* = 37 | NA | NA | NA | 4 (10.8) | 4 (10.8) | NA | 11 (29.7) | | NA | 4 (10.8) |
| | ST, *n* = 36 | NA | NA | NA | 6 (16.7) | 2 (5.6) | NA | 17 (47.2) | | NA | 1 (2.8) |
| Tran *et al.* 2023[6] | USAT, *n* = 226 | NA | NA | 4 (2) | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 146 | NA | NA | 7 (5) | NA | NA | NA | NA | NA | NA | NA |
| Monteleone *et al.*, 2024[7] | USAT, *n* = 1,577 | NA | NA | 54 (3.4) | NA | 240 (15.2) | NA | 306 (19.4) | NA | NA | NA |
| | CBE, *n* = 682 | NA | NA | 24 (3.5) | NA | 146 (21.4) | NA | 116 (17.0) | NA | NA | NA |
| Feroze *et al.* 2023[8] | CBE, *n* = 97 | NA | NA | NA | NA | 22 (22.7) | NA | NA | NA | 52 (53.6) | NA |
| | USAT, *n* = 97 | NA | NA | NA | NA | 3 (6) | NA | NA | NA | 30 (60) | NA |
| Wahood *et al.* 2023[9] | sCDT, *n* = 18,702 | NA | NA | NA | NA | 1,642 (8.78) | 3,262 (17.44) | NA | NA | NA | NA |
| | ST, *n* = 18,414 | NA | NA | NA | NA | 2,427 (13.18) | 3,673 (19.95) | NA | NA | NA | NA |
| Graif *et al.* 2020[10] | sCDT, *n* = 26 | 11 (42.3) | NA | NA | NA | 1 (3.8) | 1 (3.8) | NA | NA | 3 (11.5) | 2 (7.7) |
| | CBE, *n* = 26 | 8 (30.8) | NA | NA | NA | 0 | 0 | NA | NA | 2 (7.7) | 0 |
| Yoo *et al.* 2016[11] | ST, *n* = 44 | NA | NA | NA | 9 (20.5) | 3 (6.8) | NA | 22 (64.7) | NA | NA | NA |
| | sCDT, *n* = 28 | NA | NA | NA | 7 (25) | 0 | NA | 14 (73.7) | NA | NA | NA |
| Cho *et al.* 2015[12] | ST, *n* = 19 | 2 (11) | NA | NA | NA | 7 (37) | NA | NA | NA | NA | NA |
| | SE, *n* = 26 | 13 (50) | NA | NA | NA | 8 (31) | NA | NA | NA | NA | NA |
| Beyer *et al.* 2020[13] | USAT, *n* = 417 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 1,643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 3,376 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

(*Cont'd...*)

**Table S2.** *(Continued)*

| Study, publication year | Interventions, *n* | Predisposing factors for pulmonary embolism, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Recent surgery | Recent trauma | Previous stroke | Recent immobilization | Malignancy | Hypercoagulable state | DVT | Prior pulmonary embolism | Smoking | Contraceptive use |
| Avgerinos *et al.* 2019[14] | USAT, *n* = 54 | NA | NA | NA | NA | 11 (20.4) | 2 (3.7) | NA | NA | NA | NA |
| | ST, *n* = 18 | NA | NA | NA | NA | 7 (38.9) | 17 (5.6) | NA | NA | NA | NA |
| Avgerinos *et al.* 2018[15] | USAT, *n* = 213 | 41 (19.2) | 7 (3.3) | 3 (1.4) | NA | 35 (16.4) | 11 (5.2) | 38 (18.0) | 32 (15.2) | 40 (18.9) | 10 (4.7) |
| | ST, *n* = 104 | 30 (28.8) | 6 (5.8) | 1 (1.0) | NA | 19 (18.3) | 10 (9.6) | 13 (12.6) | 11 (10.6) | 25 (24.3) | 8 (7.7) |
| Pietrasik *et al.* 2024[16] | ST, *n* = 11 | 1 (9.1) | 0 (0) | 0 (0) | NA | 1 (9.1) | NA | 2 (18.2) | 0 (0) | 1 (9.1) | 1 (9.1) |
| | SE, *n* = 15 | 0 (0) | 0 (0) | 3 (20.0) | NA | 2 (13.3) | NA | 2 (13.3) | 1 (6.7) | 2 (13.3) | 3 (20.0) |
| | sCDT, *n* = 4<br>CBE, *n* = 13 | 3 (17.6) | 2 (11.8) | 4 (23.5) | NA | 5 (29.4) | NA | 1 (5.9) | 2 (11.8) | 3 (17.6) | 1 (5.9) |
| Macovei *et al.* 2015[17] | sCDT, *n* = 28 | NA | NA | NA | 4 (14.3) | 2 (7.1) | NA | 8 (28.6) | | NA | 4 (14.3) |
| | ST, *n* = 24 | NA | NA | NA | 4 (16.7) | 2 (8.3) | NA | 14 (53.8) | | NA | 1 (4.2) |
| Kolkailah *et al.* 2016[18] | USAT, *n* = 62 | 14 (22.6) | 0 (0) | 0 (0) | 20 (32.3) | 14 (22.6) | NA | 30 (48.4) | 8 (12.9) | 25 (40.3) | NA |
| | SE, *n* = 71 | 27 (38) | 4 (5.6) | 10 (14.1) | 28 (39.4) | 16 (22.5) | NA | 32 (45.1) | 2 (2.8) | 19 (26.8) | NA |
| Lin *et al.* 2021[19] | sCDT, *n* = 145 | 4 (2.8) | 8 (5.5) | 13 (9.0) | 19 (13.1) | 19 (13.1) | NA | 1 (0.7) | 2 (1.4) | NA | 3 (2.1) |
| | ST, *n* = 1,158 | 17 (1.5) | 61 (5.3) | 127 (11.0) | 75 (6.5) | 154 (13.3) | NA | 20 (1.7) | 13 (1.1) | NA | 10 (0.9) |
| Azari *et al.* 2015[20] | SE, *n* = 30 | 8 (26.66) | NA | NA | 21 (70) | 6 (20) | NA | 14 (46.67) | NA | NA | 2 (6.67) |
| | ST, *n* = 78 | 15 (19.23) | NA | NA | 48 (61.5) | 14 (18) | NA | 35 (44.87) | NA | NA | 4 (5.13) |
| Klevanets *et al.* 2017[21] | ST, *n* = 102 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 107 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Arora *et al.* 2017[22] | ST, *n* = 2,256 | NA | NA | NA | NA | 186 (8.24) | NA | NA | NA | NA | NA |
| | sCDT, *n* = 1,128 | NA | NA | NA | NA | 86 (7.62) | NA | NA | NA | NA | NA |
| Geller *et al.* 2020[23] | sCDT, *n* = 629 | NA | NA | 28 (4.5) | NA | 170 (27.0) | NA | 115 (18.3) | 155 (24.6) | NA | NA |
| | ST, *n* = 629 | NA | NA | 29 (4.6) | NA | 176 (28.0) | NA | 97 (15.4) | 121 (19.2) | NA | NA |
| Lehnert *et al.* 2016[24] | SE, *n* = 50 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 86 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Aymarda *et al.* 2013[25] | SE, *n* = 28 | NA | 0.07 | NA | 0.535 | 0.107 | NA | 0.39 | 0.107 | NA | NA |
| | ST, *n* = 52 | NA | 0.096 | NA | 0.788 | 0.16 | NA | 0.34 | 13.4 | NA | NA |

*(Cont'd...)*





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**Table S2.** *(Continued)*

| Study, publication year | Interventions, *n* | Predisposing factors for pulmonary embolism, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Recent surgery | Recent trauma | Previous stroke | Recent immobilization | Malignancy | Hypercoagulable state | DVT | Prior pulmonary embolism | Smoking | Contraceptive use |
| Elheet *et al.* 2024[26] | sCDT, *n* = 58 | NA | NA | 1 (1.7) | 5 (8.6) | 8 (13.8) | NA | 13 (22.4) | 9 (15.5) | NA | 5 (8.6) |
| | USAT, *n* = 77 | NA | NA | 3 (3.9) | 6 (7.8) | 9 (11.7) | NA | 16 (20.8) | 10 (13) | NA | 6 (7.8) |
| Jiang *et al.* 2020[27] | ST, *n* = 52 | 1 (1.79) | | NA | 2 (3.57) | 4 (7.14) | NA | NA | 6 (10.71) | 3 (5.77) | 3 (5.77) |
| | USAT, *n* = 47 | 2 (4.25) | | NA | 5 (10.64) | 1 (2.13) | NA | NA | 8 (17.02) | 5 (10.64) | 5 (10.64) |
| Guan *et al.* 2023[28] | ST, *n* = 37 | NA | 12 (32.43) | NA | NA | NA | NA | 14 (37.84) | | NA | NA |
| | sCDT, *n* = 37 | NA | 14 (37.84) | NA | NA | NA | NA | 18 (48.65) | | NA | NA |
| Al-Terki *et al.*, 2024[29] | USAT, *n* = 69 | NA | NA | NA | 12 (17) | 12 (17) | NA | 14 (20) | | NA | NA |
| | CBE, *n* = 26 | NA | NA | NA | 5 (19) | 5 (19) | NA | 4 (15) | | NA | NA |
| Bradley *et al.* 2021[30] | sCDT, *n* = 21 | NA | NA | NA | NA | 1 (4.8) | NA | 4 (19.1) | 5 (23.8) | 9 (42.9) | 1 (4.8) |
| | ST, *n* = 21 | NA | NA | NA | NA | 2 (9.5) | NA | 2 (9.5) | 4 (19.1) | 10 (47.6) | 1 (4.8) |
| Hobohm *et al.* 2020[31] | sCDT, *n* = 1,175 | NA | NA | NA | NA | 91 (7.7) | 17 (1.4) | NA | NA | NA | NA |
| | ST, *n* = 40,728 | NA | NA | NA | NA | 3,618 (8.9) | 458 (1.1) | NA | NA | NA | NA |
| Sharifi *et al.* 2019[32] | USAT, *n* = 47 | NA | NA | NA | NA | 8 (18) | NA | 6 (13) | | NA | 3 (6) |
| | ST, *n* = 50 | NA | NA | NA | NA | 15 (30) | NA | 8 (16) | | NA | 4 (8) |
| Hassan *et al.* 2021[33] | CBE, *n* = 25 | NA | NA | NA | NA | 3 (12) | NA | NA | NA | NA | 3 (12) |
| | ST, *n* = 25 | NA | NA | NA | NA | 1 (4) | NA | NA | NA | NA | 4 (16) |
| Kuebel *et al.* 2023[34] | USAT, *n* = 105 | NA | NA | NA | NA | 25 (23.8) | 7 (6.7) | 16 (15.2) | 13 (12.4) | 12 (11.4) | 7 (6.7) |
| | ST, *n* = 105 | NA | NA | NA | NA | 26 (24.8) | 5 (4.8) | 13 (12.4) | 14 (13.3) | 15 (14.3) | 8 (7.6) |
| Iskandar *et al.* 2022[35] | USAT, *n* = 47 | NA | NA | NA | NA | 14 (29.8) | NA | NA | NA | NA | NA |
| | CBE, *n* = 17 | NA | NA | NA | NA | 8 (47.1) | NA | NA | NA | NA | NA |
| | ST, *n* = 71 | NA | NA | NA | NA | 10 (14.1) | NA | NA | NA | NA | NA |
| Gulba *et al.* 1994[36] | SE, *n* = 13 | NA | NA | NA | NA | NA | NA | 8 (62) | 1 | NA | NA |
| | ST, *n* = 24 | NA | NA | NA | NA | NA | NA | 9 (38) | 5 (21) | NA | NA |
| Rothschild *et al.* 2019[37] | sCDT, *n* = 36 | NA | NA | NA | NA | 1 (2.8) | NA | NA | NA | 2 (5.6) | NA |
| | USAT, *n* = 62 | NA | NA | NA | NA | 2 (3.2) | NA | NA | NA | 5 (8.1) | NA |
| Rao *et al.* 2019[38] | sCDT, *n* = 33 | NA | NA | NA | NA | NA | NA | NA | 5 (15.2) | 9 (27.3) | NA |
| | USAT, *n* = 37 | NA | NA | NA | NA | NA | NA | NA | 7 (18.9) | 11 (29.7) | NA |

*(Cont'd...)*





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**Table S2.** *(Continued)*

| Study, publication year | Interventions, *n* | Predisposing factors for pulmonary embolism, *n* (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Recent surgery | Recent trauma | Previous stroke | Recent immobilization | Malignancy | Hypercoagulable state | DVT | Prior pulmonary embolism | Smoking | Contraceptive use |
| Shatla *et al.* 2024[39] | sCDT, *n* = 26,710 | NA | NA | NA | NA | NA | 4,580 (17.1) | 15,500 (58.0) | NA | 3,330 (12.5) | NA |
| | USAT, *n* = 8,060 | NA | NA | NA | NA | NA | 1,215 (15.1) | 4,620 (57.3) | NA | 1,060 (13.2) | NA |
| Lee *et al.* 2017[40] | ST, *n* = 1,854 | 140 (8) | | NA | NA | 326 (18) | NA | 828 (45) | 240 (13) | NA | NA |
| | SE, *n* = 257 | 46 (18) | | NA | NA | 48 (19) | NA | 126 (49) | 73 (28) | NA | NA |
| Percy *et al.* 2020[41] | ST, *n* = 33,553 | NA | NA | 5,175 (15.4) | NA | 3,354 (10.0) | NA | NA | NA | 8,831 (26.3) | NA |
| | sCDT, *n* = 22,336 | NA | NA | 4386 (19.6) | NA | 2,825 (12.7) | NA | NA | NA | 6,405 (28.7) | NA |
| | SE, *n* = 3,085 | NA | NA | 571 (18.5) | NA | 210 (6.8) | NA | NA | NA | 694 (22.5) | NA |
| Chan *et al.* 2023[42] | CBE, *n* = 14 | 3 (21.4) | NA | NA | NA | NA | NA | 10 (71.4) | NA | 4 (28.6) | NA |
| | USAT, *n* = 14 | 4 (28.6) | NA | NA | NA | NA | NA | 5 (35.7) | NA | 6 (42.9) | NA |
| Lin *et al.* 2022[43] | sCDT, *n* = 169 | 6 (3.6) | 10 (5.9) | 14 (8.3) | 19 (11.2) | 24 (14.2) | NA | 25 (14.8) | 31 (18.3) | NA | NA |
| | SE, *n* = 220 | 4 (1.8) | 12 (5.5) | 26 (11.8) | 11 (5.0) | 19 (8.6) | NA | 18 (8.2) | 58 (26.4) | NA | NA |
| Krishnan *et al.* 2022[44] | sCDT, *n* = 2,460 | NA | NA | NA | NA | NA | NA | NA | NA | 785 (32) | NA |
| | ST, *n* = 1,340 | NA | NA | NA | NA | NA | NA | NA | NA | 431 (32.2) | NA |
| Weekes *et al.* 2024[45] | USAT, *n* = 145 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 154 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Mahar *et al.* 2018[46] | sCDT, *n* = 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Sedhom *et al.* 2022[47] | ST, *n* = 3,570 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 30,395 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 8,089 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 2,185 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Note: NA: Not available.

Abbreviations: CBE: CatheterNAbased embolectomy; DVT: Deep vein thrombosis; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; USAT: Ultrasound-assisted thrombolysis.





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**Table S3. Clinical presentation, PESI score, baseline echocardiographic findings, and cardiac biomarker**

| Study, publication year | Interventions, *n* | Clinical presentation, *n* (%) | | | | | PESI score, mean (SD) | TTE | | Baseline cardiac biomarkers, mean (SD) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Syncope | Hypotension | Breathlessness | Chest pain | Palpitations | | RVSP, mean (SD) (mmHg) | PASP mean (SD) (mmHg) | Troponin (ng/mL) | Brain natriuretic peptide (ng/L) |
| Tated *et al.* 2021[1] | sCDT, *n* = 25 | 7 (28) | NA | 25 (100) | 2 (8) | 5 (20) | 125.48 (27.50) | 70.80 (14.42) | NA | NA | NA |
| | ST, *n* = 25 | 7 (28) | NA | 21 (84) | 7 (28) | 4 (25) | 112.20 (34.64) | 71.96 (12.24) | NA | NA | NA |
| Avgerinos *et al.*, 2021[2] | USAT, *n* = 40 | 7 (18) | NA | NA | NA | NA | NA | NA | 55 (15) | 0.34 (0.39) | 629 (1,232) |
| | sCDT, *n* = 41 | 8 (20) | NA | NA | NA | NA | NA | NA | 57 (16) | 0.73 (1.75) | 517 (817) |
| Sekulic *et al.* 2020[3] | ST, *n* = 91 | NA | NA | NA | NA | NA | NA | 54.6 (16.8) | NA | 0.27 (0.45) | 264.27 (295.29) |
| | USAT, *n* = 24 | NA | NA | NA | NA | NA | NA | 60.8 (19.5) | NA | 0.27 (0.47) | 172.53 (96.46) |
| Lin *et al.* 2009[4] | USAT, *n* = 11 | 1 (9) | 2 (18) | 8 (73) | 3 (27) | 4 (36) | NA | NA | NA | NA | NA |
| | sCDT, *n* = 14 | 1 (7) | 3 (21) | 11 (79) | 6 (43) | 4 (28) | NA | NA | NA | NA | NA |
| Macovei *et al.* 2020[5] | sCDT, *n* = 37 | 14 (37.8) | | 37 (100) | 23 (62.2) | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 36 | 15 (41.7) | | 34 (94.4) | 19 (52.8) | NA | NA | NA | NA | NA | NA |
| Tran *et al.* 2023[6] | USAT, *n* = 226 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 146 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Monteleone *et al.*, 2024[7] | USAT, *n* = 1,577 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 682 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Feroze *et al.* 2023[8] | CBE, *n* = 97 | NA | NA | NA | NA | NA | 137.00 (56.44) | NA | 51.00 (13.55) | 0.53 (0.73) | 185.50 (229.53) |
| | USAT, *n* = 97 | NA | NA | NA | NA | NA | 111.33 (41.22) | NA | 56.33 (12.21) | 0.27 (0.47) | 155.67 (262.42) |
| Wahood *et al.* 2023[9] | sCDT, *n* = 18,702 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 18,414 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

(*Cont'd...*)





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**Table S3.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical presentation, *n* (%) | | | | | PESI score, mean (SD) | TTE | | Baseline cardiac biomarkers, mean (SD) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Syncope | Hypotension | Breathlessness | Chest pain | Palpitations | | RVSP, mean (SD) (mmHg) | PASP mean (SD) (mmHg) | Troponin (ng/mL) | Brain natriuretic peptide (ng/L) |
| Graif *et al.* 2020[10] | sCDT, *n* = 26 | NA | NA | NA | NA | NA | 115.6 (28.6) | NA | 54.5 (12.9) | NA | 3,820 (4,536) |
| | CBE, *n* = 26 | NA | NA | NA | NA | NA | 101.6 (29.1) | NA | 54.5 (16.3) | NA | 3,173 (4,382) |
| Yoo *et al.* 2016[11] | ST, *n* = 44 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 28 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Cho *et al.* 2015[12] | ST, *n* = 19 | NA | NA | NA | NA | NA | NA | NA | NA | 0.785 | 2,598 |
| | SE, *n* = 26 | NA | NA | NA | NA | NA | NA | NA | NA | 1.078 | 328.65 |
| Beyer *et al.* 2020[13] | USAT, *n* = 417 | NA | 31 (7.4) | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 1,643 | NA | 174 (10.6) | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 3,376 | NA | 404 (12.0) | NA | NA | NA | NA | NA | NA | NA | NA |
| Avgerinos *et al.* 2019[14] | USAT, *n* = 54 | NA | | NA | NA | NA | NA | NA | NA | 0.79 (1.77) | 493.3 (383.0) |
| | ST, *n* = 18 | NA | NA | NA | NA | NA | NA | NA | NA | 0.97 (1.40) | 266.7 (237.5) |
| Avgerinos *et al.* 2018[15] | USAT, *n* = 213 | NA | NA | NA | NA | NA | 191 (89.7) | NA | NA | 0.6 (1.0) | 423. (484.1) |
| | ST, *n* = 104 | NA | NA | NA | NA | NA | 103 (99.0) | NA | NA | 2.2 (6.5) | 492.4 (461.3) |
| Pietrasik *et al.* 2024[16] | ST, *n* = 11 | 3 (27.3) | NA | 8 (72.7) | 7 (63.6) | NA | 2.00(1.34) | NA | NA | NA | NA |
| | SE, *n* = 15 | 2 (13.3) | NA | 14 (93.3) | 3 (20.0) | NA | 1.60 (1.18) | NA | NA | NA | NA |
| | sCDT, *n* = 4 | 5 (29.4) | NA | 17 (100) | 5 (29.4) | NA | 2.41 (1.06) | NA | NA | NA | NA |
| | CBE, *n* = 13 | | NA | | | NA | | NA | NA | NA | NA |
| Macovei *et al.* 2015[17] | sCDT, *n* = 28 | 11 (39.3) | NA | 28 (100) | 18 (63.4) | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 24 | 9 (37.5) | NA | 24 (100) | 14 (53.8) | NA | NA | NA | NA | NA | NA |
| Kolkailah *et al.* 2016[18] | USAT, *n* = 62 | NA | NA | NA | NA | NA | NA | NA | 38.5 (16) | NA | NA |
| | SE, *n* = 71 | NA | NA | NA | NA | NA | NA | NA | 43.4 (18) | NA | NA |
| Lin *et al.* 2021[19] | sCDT, *n* = 145 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 1,158 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

*(Cont'd...)*





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**Table S3.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical presentation, *n* (%) | | | | | PESI score, mean (SD) | TTE | | Baseline cardiac biomarkers, mean (SD) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Syncope | Hypotension | Breathlessness | Chest pain | Palpitations | | RVSP, mean (SD) (mmHg) | PASP mean (SD) (mmHg) | Troponin (ng/mL) | Brain natriuretic peptide (ng/L) |
| Azari *et al.* 2015[20] | SE, *n* = 30 | NA | NA | NA | NA | NA | NA | NA | 52.27 (6.5) | NA | NA |
| | ST, *n* = 78 | NA | NA | NA | NA | NA | NA | NA | 48.41 (4.98) | NA | NA |
| Klevanets *et al.* 2017[21] | ST, *n* = 102 | NA | NA | NA | NA | NA | NA | 54.5 (20.3) | 40.9 (14.1) | NA | NA |
| | sCDT, *n* = 107 | NA | NA | NA | NA | NA | NA | 36.1 (16.6) | 24.5 (8) | NA | NA |
| Arora *et al.* 2017[22] | ST, *n* = 2,256 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 1,128 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Geller *et al.* 2020[23] | sCDT, *n* = 629 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 629 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Lehnert *et al.* 2016[24] | SE, *n* = 50 | 20 (40) | 16 (32) | 35 (70) | 14 (28) | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 86 | 33 (38.37) | 15 (17.44) | 70 (81.39) | 24 (27.91) | NA | NA | NA | NA | NA | NA |
| Aymarda *et al.* 2013[25] | SE, *n* = 28 | NA | NA | 4(14) | | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 52 | NA | NA | 3(5.7) | NA | NA | NA | NA | NA | NA | NA |
| Elheet *et al.* 2024[26] | sCDT, *n* = 58 | 11 (19) | 16 (27.6) | NA | NA | 25 (43.1) | NA | NA | NA | NA | NA |
| | USAT, *n* = 77 | 15 (19.5) | 14 (18.2) | NA | NA | 42 (55.3) | NA | NA | NA | NA | NA |
| Jiang *et al.* 2020[27] | ST, *n* = 52 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | USAT, *n* = 47 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Guan *et al.* 2023[28] | ST, *n* = 37 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 37 | NA | NA | NA | NA | NA | NA | NA | NA | 0.098 (0.056–0.288) | NA |
| Al-Terki *et al.*, 2024[29] | USAT, *n* = 69 | NA | NA | NA | NA | NA | NA | NA | NA | 0.084 (0.055–0.192) | NA |
| | CBE, *n* = 26 | NA | NA | NA | NA | NA | NA | NA | NA | 0.42 (0.65) | 381.4 (103.4) |

(*Cont'd...*)





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**Table S3.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical presentation, *n* (%) | | | | | PESI score, mean (SD) | TTE | | Baseline cardiac biomarkers, mean (SD) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Syncope | Hypotension | Breathlessness | Chest pain | Palpitations | | RVSP, mean (SD) (mmHg) | PASP mean (SD) (mmHg) | Troponin (ng/mL) | Brain natriuretic peptide (ng/L) |
| Bradley *et al.* 2021[30] | sCDT, *n* = 21 | NA | NA | NA | NA | NA | NA | NA | NA | 0.69 (1.6) | 495.3 (111.7) |
| | ST, *n* = 21 | NA | NA | NA | NA | NA | NA | NA | NA | 0.098 (0.056–0.288) | NA |
| Hobohm *et al.* 2020[31] | sCDT, *n* = 1,175 | 44 (3.7) | 155 (13.2) | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 40,728 | 1,187 (2.9) | 8,414 (20.7) | NA | NA | NA | NA | NA | NA | NA | NA |
| Sharifi *et al.* 2019[32] | USAT, *n* = 47 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 50 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Hassan *et al.* 2021[33] | CBE, *n* = 25 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 25 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Kuebel *et al.* 2023[34] | USAT, *n* = 105 | NA | NA | NA | NA | NA | NA | NA | 59.68 (8.35) | NA | NA |
| | ST, *n* = 105 | NA | NA | NA | NA | NA | NA | NA | 52.2 (6.63) | NA | NA |
| Iskandar *et al.* 2022[35] | USAT, *n* = 47 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 17 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 71 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Gulba *et al.* 1994[36] | SE, *n* = 13 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 24 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Rothschild *et al.* 2019[37] | sCDT, *n* = 36 | NA | NA | NA | NA | NA | NA | NA | 55.3 (16.0) | NA | 259.8 (265.6) |
| | USAT, *n* = 62 | NA | NA | NA | NA | NA | NA | NA | 55.7 (12.3) | NA | 226.9 (248.4) |

(*Cont'd...*)





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**Table S3.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical presentation, *n* (%) | | | | | PESI score, mean (SD) | TTE | | Baseline cardiac biomarkers, mean (SD) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Syncope | Hypotension | Breathlessness | Chest pain | Palpitations | | RVSP, mean (SD) (mmHg) | PASP mean (SD) (mmHg) | Troponin (ng/mL) | Brain natriuretic peptide (ng/L) |
| Rao *et al.* 2019[38] | sCDT, *n* = 33 | NA | NA | NA | NA | NA | NA | 52 (18) | NA | NA | NA |
| | USAT, *n* = 37 | NA | NA | NA | NA | NA | NA | 54 (13) | NA | NA | NA |
| Shatla *et al.* 2024[39] | sCDT, *n* = 26,710 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | USAT, *n* = 8,060 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Lee *et al.* 2017[40] | ST, *n* = 1,854 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 257 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Percy *et al.* 2020[41] | ST, *n* = 33,553 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 22,336 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 3,085 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Chan *et al.* 2023[42] | CBE, *n* = 14 | NA | NA | NA | NA | NA | 135.1 (63.4) | NA | NA | NA | NA |
| | USAT, *n* = 14 | NA | NA | NA | NA | NA | 125.4 (56.4) | NA | NA | NA | NA |
| Lin *et al.* 2022[43] | sCDT, *n* = 169 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 220 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Krishnan *et al.* 2022[44] | sCDT, *n* = 2,460 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 1,340 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

(*Cont'd...*)





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**Table S3.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical presentation, *n* (%) | | | | | PESI score, mean (SD) | TTE | | Baseline cardiac biomarkers, mean (SD) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Syncope | Hypotension | Breathlessness | Chest pain | Palpitations | | RVSP, mean (SD) (mmHg) | PASP mean (SD) (mmHg) | Troponin (ng/mL) | Brain natriuretic peptide (ng/L) |
| Weekes *et al.* 2024[45] | USAT, *n* = 145 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 154 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Mahar *et al.* 2018[46] | sCDT, *n* = 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | ST, *n* = 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Sedhom *et al.* 2022[47] | ST, *n* = 3,570 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | sCDT, *n* = 30,395 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | CBE, *n* = 8,089 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | SE, *n* = 2,185 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

Note: NA: Not available.

Abbreviations: CBE: CatheterNAbased embolectomy; PASP: Pulmonary artery systolic pressure; PESI: Pulmonary Embolism Severity Index; RVSP: Right-sided ventricular pressure; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; TTE: Transthoracic echocardiography; USAT: Ultrasound-assisted thrombolysis.





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**Table S4. Clinical outcomes among the included patients in the included studies**

| Study, publication year | Interventions, *n* | Clinical outcomes, *n* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Short-term mortality | Long-term mortality | Any bleeding | Major bleeding | GI bleeding | ICH | Blood transfusion |
| Tated *et al.* 2021[1] | sCDT, *n* = 25 | 2 | NA | 2 | 0 | NA | NA | NA |
| | ST, *n* = 25 | 3 | NA | 5 | 2 | NA | NA | NA |
| Avgerinos *et al.*, 2021[2] | USAT, *n* = 40 | 1 | NA | 5 | 2 | NA | 1 | NA |
| | sCDT, *n* = 41 | 0 | NA | 0 | 0 | NA | 0 | NA |
| Sekulic *et al.* 2020[3] | ST, *n* = 91 | 16 | NA | 8 | 7 | NA | 1 | NA |
| | USAT, *n* = 24 | 0 | NA | 5 | 2 | NA | 0 | NA |
| Lin *et al.* 2009[4] | USAT, *n* = 11 | 1 | NA | NA | 0 | NA | NA | NA |
| | sCDT, *n* = 14 | 2 | NA | NA | 3 | NA | NA | NA |
| Macovei *et al.* 2020[5] | sCDT, *n* = 37 | 1 | 4 | 10 | 4 | NA | NA | NA |
| | ST, *n* = 36 | 10 | 14 | 15 | 8 | NA | NA | NA |
| Tran *et al.* 2023[6] | USAT, *n* = 226 | 2 | NA | NA | 7 | NA | 1 | 11 |
| | CBE, *n* = 146 | 1 | NA | NA | 3 | NA | 0 | 11 |
| Monteleone *et al.*, 2024[7] | USAT, *n* = 1,577 | 41 | NA | NA | NA | NA | 5 | NA |
| | CBE, *n* = 682 | 25 | NA | NA | | NA | 9 | |
| Feroze *et al.* 2023[8] | CBE, *n* = 97 | 7 | 15 | NA | 16 | NA | 1 | 2 |
| | USAT, *n* = 97 | 1 | 5 | NA | 5 | NA | 0 | 1 |
| Wahood *et al.* 2023[9] | sCDT, *n* = 18,702 | 55 | NA | NA | NA | 314 | 75 | NA |
| | ST, *n* = 18,414 | 119 | NA | NA | NA | 634 | 177 | NA |
| Graif *et al.* 2020[10] | sCDT, *n* = 26 | 0 | NA | 2 | 1 | NA | NA | NA |
| | CBE, *n* = 26 | 2 | NA | 1 | 0 | NA | NA | NA |
| Yoo *et al.* 2016[11] | ST, *n* = 44 | 6 | NA | 12 | 2 | NA | NA | NA |
| | sCDT, *n* = 28 | 4 | NA | 6 | 1 | NA | NA | NA |
| Cho *et al.* 2015[12] | ST, *n* = 19 | 7 | 8 | NA | NA | NA | NA | NA |
| | SE, *n* = 26 | 4 | 10 | NA | NA | NA | NA | NA |
| Beyer *et al.* 2020[13] | USAT, *n* = 417 | 23 | NA | 41 | NA | 29 | 8 | 7 |
| | sCDT, *n* = 1,643 | 121 | NA | 139 | NA | 118 | 6 | 18 |
| | ST, *n* = 3,376 | 577 | NA | 507 | NA | 389 | 47 | 105 |

(*Cont'd...*)





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**Table S4.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical outcomes, *n* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Short-term mortality | Long-term mortality | Any bleeding | Major bleeding | GI bleeding | ICH | Blood transfusion |
| Avgerinos *et al.* 2019[14] | USAT, *n* = 54 | 2 | NA | NA | 8 | NA | NA | 7 |
| | ST, *n* = 18 | 3 | NA | NA | 3 | NA | NA | 2 |
| Avgerinos *et al.* 2018[15] | USAT, *n* = 213 | 3 | NA | NA | 17 | NA | NA | NA |
| | ST, *n* = 104 | 14 | NA | NA | 20 | NA | NA | NA |
| Pietrasik *et al.* 2024[16] | ST, *n* = 11 | 2 | NA | 4 | 1 | NA | NA | NA |
| | SE, *n* = 15 | 0 | NA | 1 | 1 | NA | NA | NA |
| | sCDT, *n* = 4 | 0 | NA | 0 | 0 | NA | NA | NA |
| | CBE, *n* = 13 | 5 | NA | 1 | 1 | NA | NA | NA |
| Macovei *et al.* 2015[17] | sCDT, *n* = 28 | 0 | NA | 10 | 4 | NA | NA | NA |
| | ST, *n* = 24 | 7 | NA | 12 | 5 | NA | NA | NA |
| Kolkailah *et al.* 2016[18] | USAT, *n* = 62 | 2 | NA | 6 | NA | NA | 1 | NA |
| | SE, *n* = 71 | 5 | NA | 1 | NA | NA | 0 | NA |
| Lin *et al.* 2021[19] | sCDT, *n* = 145 | 22 | 34 | NA | 13 | 11 | 2 | 2 |
| | ST, *n* = 1,158 | 250 | 303 | NA | 91 | 70 | 21 | 20 |
| Azari *et al.* 2015[20] | SE, *n* = 30 | 1 | NA | 0 | NA | 0 | 0 | NA |
| | ST, *n* = 78 | 6 | NA | 6 | NA | 1 | 1 | NA |
| Klevanets *et al.* 2017[21] | ST, *n* = 102 | 5 | 1 | NA | 4 | NA | 3 | NA |
| | sCDT, *n* = 107 | 1 | 2 | NA | 0 | NA | 0 | NA |
| Arora *et al.* 2017[22] | ST, *n* = 2,256 | 239 | NA | 152 | NA | 82 | 23 | 263 |
| | sCDT, *n* = 1,128 | 86 | NA | 80 | NA | 22 | 9 | 104 |
| Geller *et al.* 2020[23] | sCDT, *n* = 629 | 50 | 73 | 100 | NA | 40 | 12 | NA |
| | ST, *n* = 629 | 78 | 102 | 55 | NA | 19 | 12 | NA |
| Lehnert *et al.* 2016[24] | SE, *n* = 50 | 4 | 9 | 0 | 0 | NA | NA | NA |
| | ST, *n* = 86 | 12 | 14 | 17 | 2 | NA | NA | NA |
| Aymarda *et al.* 2013[25] | SE, *n* = 28 | 1 | 5 | 1 | NA | NA | 1 | NA |
| | ST, *n* = 52 | 7 | 12 | 14 | NA | NA | 2 | NA |
| Elheet *et al.* 2024[26] | sCDT, *n* = 58 | 6 | NA | 25 | 2 | NA | NA | 12 |
| | USAT, *n* = 77 | 3 | NA | 14 | 0 | NA | NA | 5 |

(*Cont'd...*)





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**Table S4.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical outcomes, *n* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Short-term mortality | Long-term mortality | Any bleeding | Major bleeding | GI bleeding | ICH | Blood transfusion |
| Jiang *et al.* 2020[27] | ST, *n* = 52 | 3 | 4 | 5 | 1 | NA | 1 | NA |
| | USAT, *n* = 47 | 0 | 0 | 3 | 2 | NA | 1 | NA |
| Guan *et al.* 2023[28] | ST, *n* = 37 | NA | NA | 17 | NA | NA | NA | NA |
| | sCDT, *n* = 37 | NA | NA | 5 | NA | NA | NA | NA |
| Al-Terki *et al.*, 2024[29] | USAT, *n* = 69 | 7 | NA | 1 | NA | NA | NA | NA |
| | CBE, *n* = 26 | 1 | NA | 0 | NA | NA | NA | NA |
| Bradley *et al.* 2021[30] | sCDT, *n* = 21 | 1 | NA | 0 | NA | NA | NA | 0 |
| | ST, *n* = 21 | 0 | NA | 3 | NA | NA | NA | 1 |
| Hobohm *et al.* 2020[31] | sCDT, *n* = 1,175 | 225 | NA | NA | 243 | 15 | 14 | 234 |
| | ST, *n* = 40,728 | 18,301 | NA | NA | 9,315 | 720 | 693 | 8,792 |
| Sharifi *et al.* 2019[32] | USAT, *n* = 47 | 2 | NA | 2 | NA | NA | NA | 3 |
| | ST, *n* = 50 | 0 | NA | 0 | NA | NA | NA | 0 |
| Hassan *et al.* 2021[33] | CBE, *n* = 25 | 5 | NA | 1 | 0 | NA | NA | NA |
| | ST, *n* = 25 | 8 | NA | 4 | 1 | NA | NA | NA |
| Kuebel *et al.* 2023[34] | USAT, *n* = 105 | 3 | NA | NA | 16 | NA | NA | 7 |
| | ST, *n* = 105 | 28 | NA | NA | 24 | NA | NA | 12 |
| Iskandar *et al.* 2022[35] | USAT, *n* = 47 | 2 | NA | NA | 10 | NA | 0 | NA |
| | CBE, *n* = 17 | 4 | NA | NA | 7 | NA | 1 | NA |
| | ST, *n* = 71 | 14 | NA | NA | 11 | NA | 3 | NA |
| Gulba *et al.* 1994[36] | SE, *n* = 13 | NA | NA | NA | 2 | NA | 0 | NA |
| | ST, *n* = 24 | NA | NA | NA | 6 | NA | 1 | NA |
| Rothschild *et al.* 2019[37] | sCDT, *n* = 36 | 1 | NA | NA | 3 | NA | NA | |
| | USAT, *n* = 62 | 5 | NA | NA | 8 | NA | NA | |
| Rao *et al.* 2019[38] | sCDT, *n* = 33 | NA | NA | NA | 0 | NA | NA | 0 |
| | USAT, *n* = 37 | NA | NA | NA | 1 | NA | NA | 1 |
| Shatla *et al.* 2024[39] | sCDT, *n* = 26,710 | 1,020 | NA | 1,255 | NA | NA | 155 | 855 |
| | USAT, *n* = 8,060 | 220 | NA | 370 | NA | NA | 30 | 190 |

(*Cont'd...*)





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**Table S4.** *(Continued)*

| Study, publication year | Interventions, *n* | Clinical outcomes, *n* | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Short-term mortality | Long-term mortality | Any bleeding | Major bleeding | GI bleeding | ICH | Blood transfusion |
| Lee *et al.* 2017[40] | ST, *n* = 1,854 | 282 | NA | NA | 67 | NA | NA | 225 |
| | SE, *n* = 257 | 34 | NA | NA | 23 | NA | NA | 51 |
| Percy *et al.* 2020[41] | ST, *n* = 33,553 | 5,294 | NA | NA | 5,938 | NA | 719 | 5,408 |
| | sCDT, *n* = 22,336 | 5,294 | NA | NA | 2,730 | NA | 154 | 2,286 |
| | SE, *n* = 3,085 | 608 | NA | NA | 487 | NA | 50 | 982 |
| Chan *et al.* 2023[42] | CBE, *n* = 14 | 0 | NA | 7 | 7 | NA | 0 | 7 |
| | USAT, *n* = 14 | 5 | NA | 3 | 3 | | 1 | 2 |
| Lin *et al.* 2022[43] | sCDT, *n* = 169 | 27 | 52 | NA | 3 | 14 | 2 | 2 |
| | SE, *n* = 220 | 57 | 80 | NA | 3 | 9 | 2 | 3 |
| Krishnan *et al.* 2022[44] | sCDT, *n* = 2,460 | 74 | NA | NA | NA | NA | NA | 60 |
| | ST, *n* = 1,340 | 151 | NA | NA | NA | NA | NA | 63 |
| Weekes *et al.* 2024[45] | USAT, *n* = 145 | 6 | NA | NA | 19 | NA | NA | NA |
| | ST, *n* = 154 | 30 | NA | NA | 33 | NA | NA | NA |
| | SE, *n* = 9 | 0 | NA | NA | 7 | NA | NA | NA |
| Mahar *et al.* 2018[46] | sCDT, *n* = 14 | 2 | NA | NA | 3 | NA | NA | NA |
| | SE, *n* = 6 | 1 | NA | NA | 0 | NA | NA | NA |
| | ST, *n* = 22 | 1 | NA | NA | 0 | NA | NA | NA |
| | CBE, *n* = 4 | 1 | NA | NA | 0 | NA | NA | NA |
| Sedhom *et al.* 2022[47] | ST, *n* = 3,570 | 5,033 | NA | 4,737 | NA | NA | 556 | NA |
| | sCDT, *n* = 30,395 | 1,415 | NA | 3275 | NA | NA | 185 | NA |
| | CBE, *n* = 8,089 | 898 | NA | 1,443 | NA | NA | 234 | NA |
| | SE, *n* = 2,185 | 279 | NA | 491 | NA | NA | 66 | NA |

Note: NA: Not available.

Abbreviations: CBE: Catheter-based embolectomy; GI: Gastrointestinal; ICH: Intracranial hemorrhage; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; USAT: Ultrasound-assisted thrombolysis.





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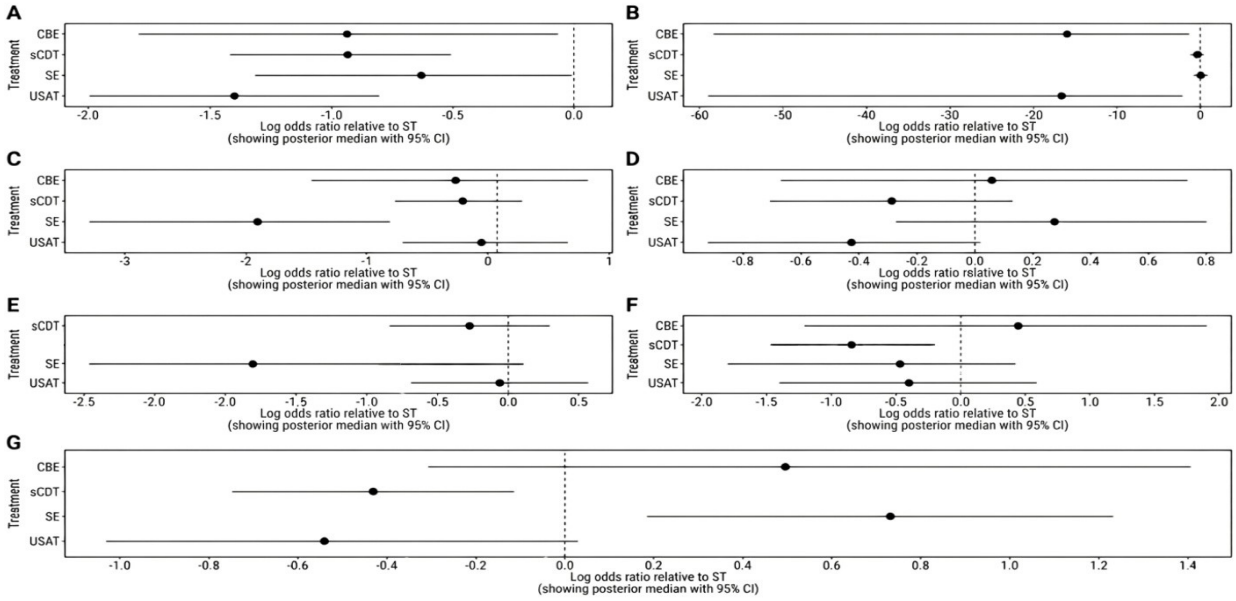


**Figure S4.** NMA forest plot with ST as comparator for included interventions: (A) For short-term mortality; (B) For long-term mortality; (C) For any bleeding; (D) For major bleeding; (E) For GI bleeding; (F) For intracranial hemorrhage; (G) For blood transfusion
Abbreviations: NMA: Network meta-analysis; ST: Systemic thrombolysis.

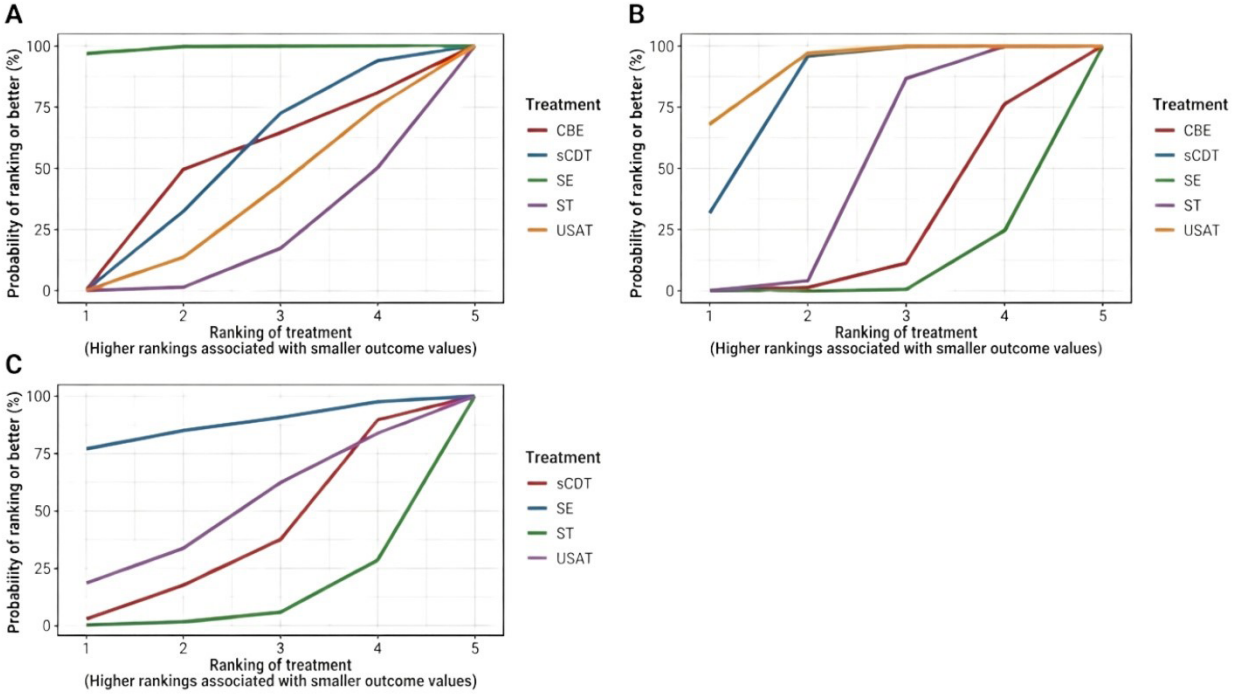


**Figure S5.** Cumulative probability ranking chart for included interventions. The SUCRA intuitively displays the sorting probability of each intervention group in the form of a curve: (A) For any bleeding, (B) For GI bleeding, (C) For blood transfusion
Abbreviations: CBE: Catheter-based embolectomy; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; SUCRA: Surface under the cumulative ranking curve; USAT: Ultrasound-assisted thrombolysis.

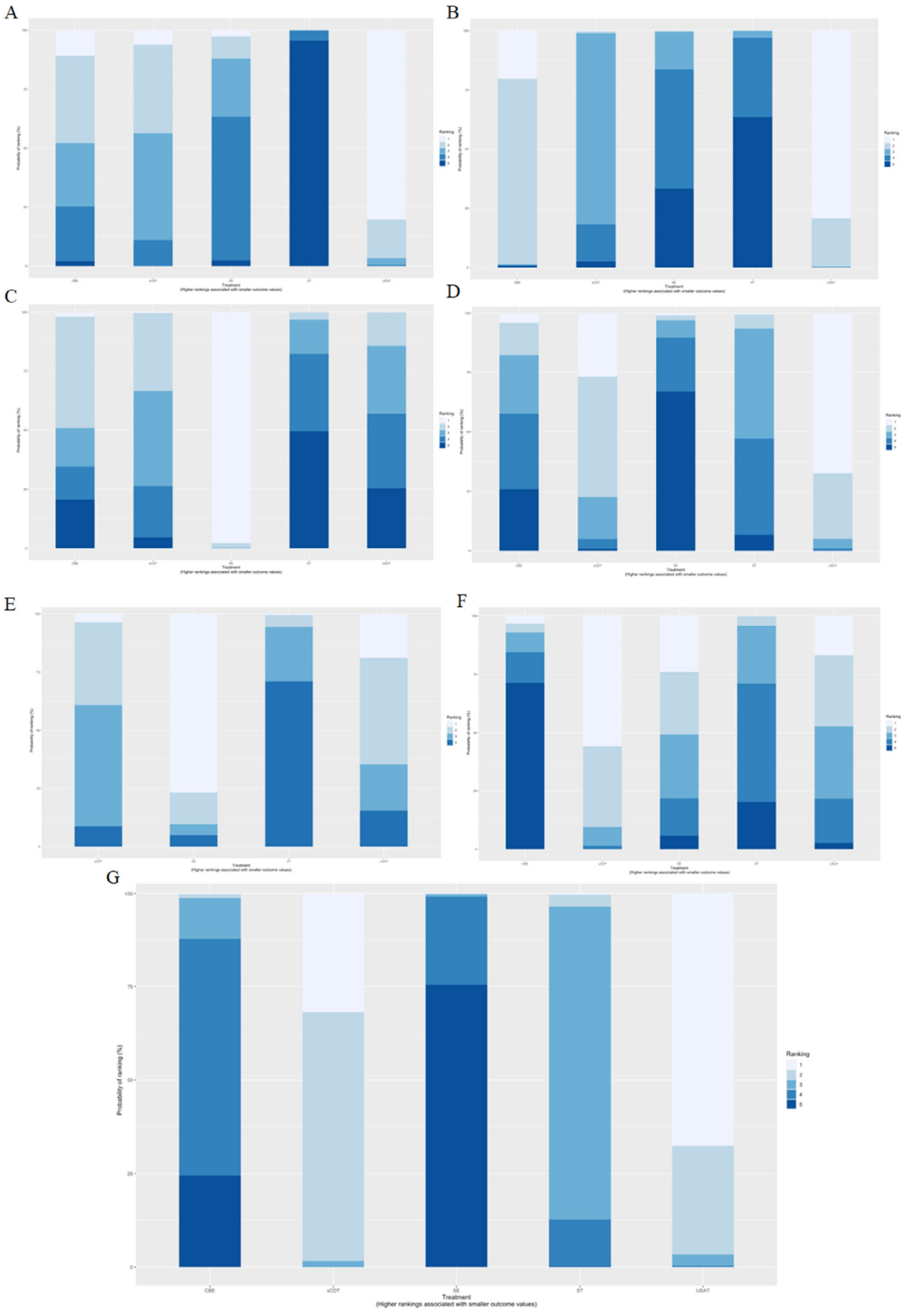


**Figure S6.** Cumulative ranking probability histogram for included interventions. The SUCRA and rankogram charts intuitively display the sorting probability of each intervention group in the form of a histogram: (A) For short-term mortality, (B) For long-term mortality, (C) For any bleeding; (D) For major bleeding, (E) For gastrointestinal bleeding, (F) For intracranial hemorrhage, (G) For blood transfusion

Abbreviations: CBE: Catheter-based embolectomy; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; SUCRA: Surface under the cumulative ranking curve; USAT: Ultrasound-assisted thrombolysis.

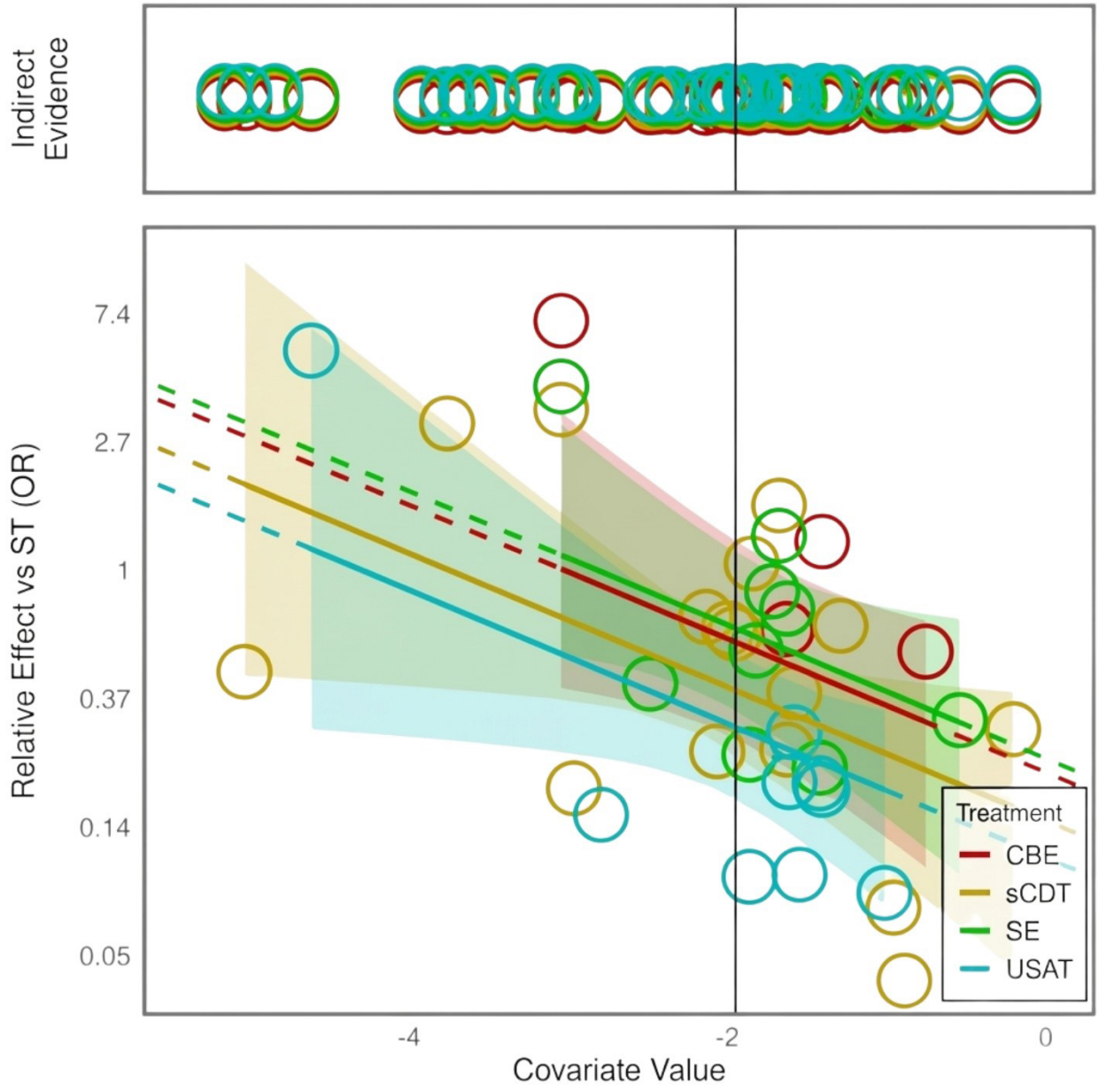


**Figure S7.** Network meta-regression plot of the short-term mortality for included interventions according to their baseline risk
Abbreviations: CBE: Catheter-based embolectomy; OR: Odds ratio; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; USAT: Ultrasound-assisted thrombolysis.

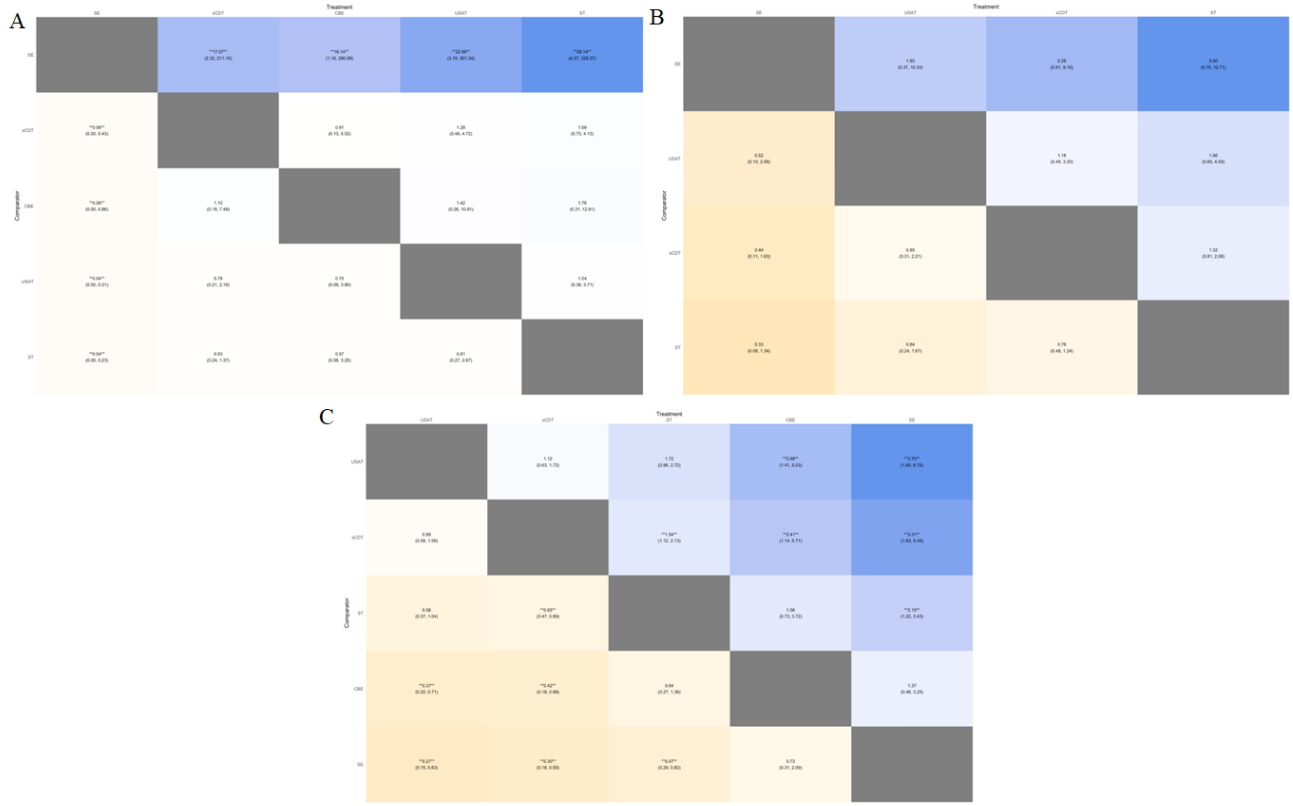


**Figure S8.** Ranking chart heat maps for included interventions. Data are ORs (95% CrI) of the treatment on the top, compared with the comparator on the left. OR > 1.0 indicates a treatment advantage, whereas OR < 1.0 indicates a comparator advantage. Statistically significant results ($p < 0.05$) are marked by double asterisks (**): (A) For any bleeding, (B) For GI bleeding, (C) For blood transfusion

Abbreviations: CBE: Catheter-based embolectomy; CrI: Credible interval; OR: Odds ratio; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; USAT: Ultrasound-assisted thrombolysis.

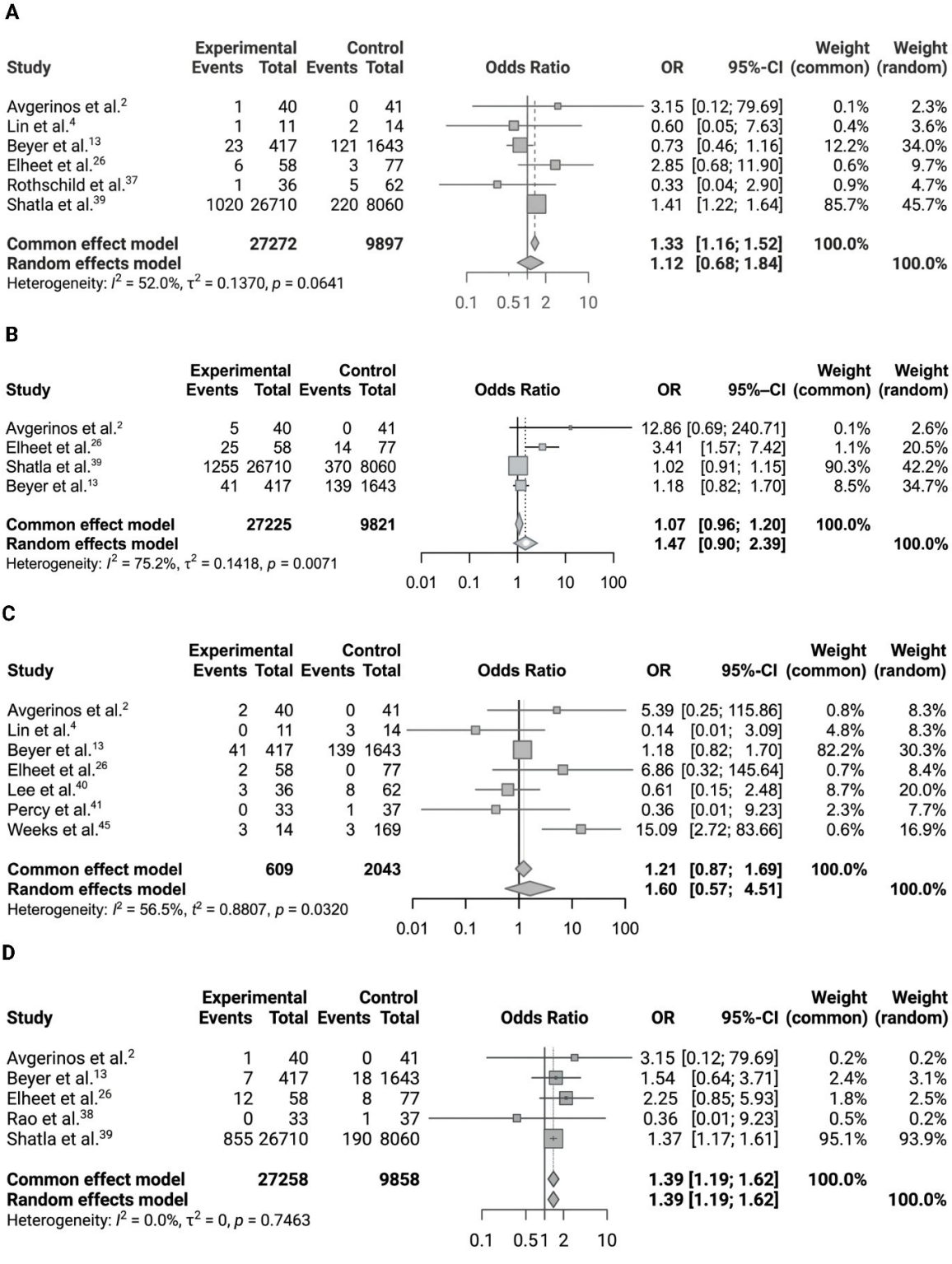


**Figure S9.** Pairwise comparison meta-analysis with $I^2$ statistic for standard catheter-directed thrombolysis (experimental) vs ultrasound-assisted thrombolysis (control) for included interventions: (A) For short-term mortality, (B) For any bleeding, (C) For major bleeding, (D) For blood transfusion

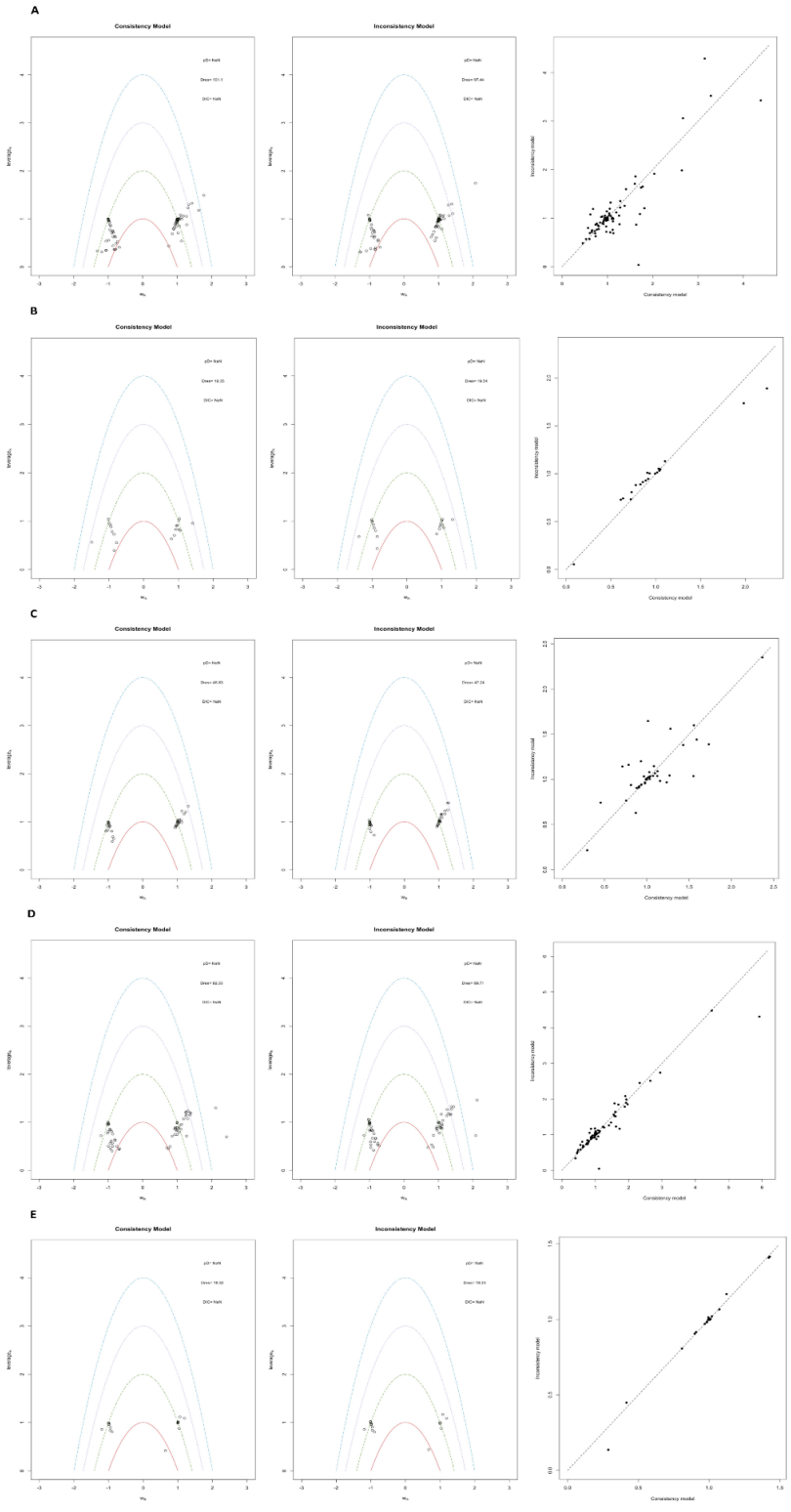


**Figure S10.** *Cont'd...*

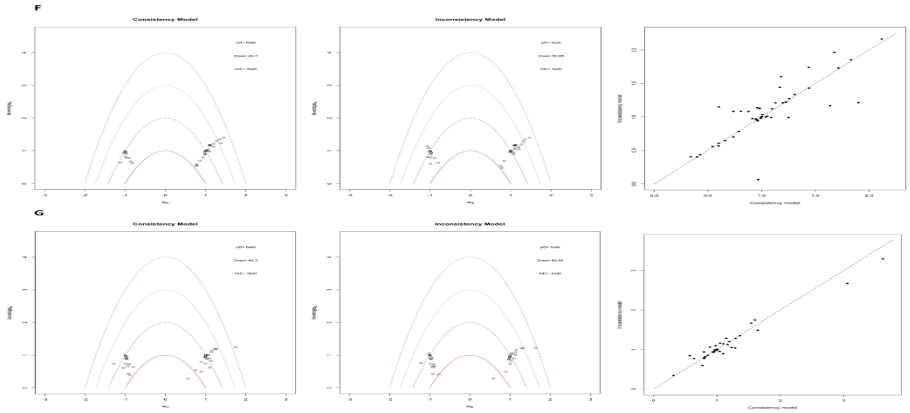

**Figure S10.** Comparing the random effect model data fit. Consistency versus inconsistency models and individual data points' posterior mean deviance contributions for the random effect consistency model vs the random effect inconsistency model: (A) For short term mortality, (B) For long term mortality, (C) For any bleeding, (D) For major bleeding, (E) For gastrointestinal bleeding, (F) For intracranial hemorrhage, (G) For blood transfusion

**Table S5. SUCRA values for different outcomes for different interventions in the random effect model (all studies)**

| Interventions | Outcomes | | | | | | |
|---|---|---|---|---|---|---|---|
| | Short-term mortality | Long-term mortality | Any bleeding | Major bleeding | Gastrointestinal bleeding | Intracranial hemorrhage | Blood transfusion |
| USAT | 94.11[a] | 94.67[a] | 33.03 | 90.37[a] | 56.1 | 59.99 | 91[a] |
| sCDT | 59.7 | 45.2 | 50.72 | 74.7 | 44.69 | 86.2[a] | 82.54 |
| CBE | 57.84 | 79.37 | 49 | 34.67 | NA | 13.66[b] | 22.29 |
| SE | 37.23 | 20.9 | 99.37[a] | 11.85[b] | 87.46[a] | 61.85 | 6.43[b] |
| ST | 1.12[b] | 9.88[b] | 17.88[b] | 38.39 | 11.76[b] | 28.29 | 47.72 |

Notes: [a]Highest SUCRA value; [b]lowest SUCRA value.
Abbreviations: CBE: Catheter-based embolectomy; sCDT: Standard catheter-directed thrombolysis; SE: Surgical pulmonary embolectomy; ST: Systemic thrombolysis; SUCRA: Surface under the cumulative ranking curve; USAT: Ultrasound-assisted thrombolysis.

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