Supplementary data

Supplementary Appendix 1. Details of the AngioJet rheolytic thrombectomy procedure

Briefly, systemic heparinisation was achieved and the AngioJet system was advanced over the 0.035-inch stiff hydrophilic guidewire which passed through the emboli and was anchored distally in the subsegmental branches. Prior to activating the Solent Omni catheter, contrast was injected through the catheter lumen, ensuring that the culprit vessel diameter was >3 mm. Before the standard ART, we used power pulse-spray mode with local infusions of adjunctive urokinase (200,000 IU) directly into the thrombus through the second effluent lumen, whenever not absolutely contraindicated (e.g., head trauma, brain surgery and other major surgical procedures) for fibrinolysis. Then, rheolytic thrombectomy was performed 15-20 min after local thrombolysis, and the catheter was activated back and forth inside the thrombus with at least two runs (less than 7-10 sec per run). ART was continued until all major branches of the pulmonary arteries became recanalised, or the haemodynamic condition of the patient was improved. Mean pulmonary artery pressures (PAPs) were determined before and after the procedure. Patients with LEDVT received an inferior vena caval filter, according to the results of a venous ultrasound scan. LEDVT was treated simultaneously as mentioned above.

Supplementary Appendix 2. Detailed description of the three transient cardiac arrest patients

Patient no. 1: a 21-year-old male who had undergone kidney cancer surgery seven days previously presented with acute severe shortness of breath accompanied by bilateral oppressive chest discomfort. He had shock after admission to hospital. After resuscitation, an emergency ART was performed. Refractory bradycardia and transient cardiac arrest occurred during the ART procedure and intra-aortic balloon pumping

was used to improve cardiac output.

Patient no. 2: a 49-year-old female who had undergone radical mastectomy five days previously due to breast cancer presented with dyspnoea and hypotension. She went into shock after pulmonary CTA scanning. An emergency ART was performed under inotropic support for management of massive pulmonary embolism (MPE). Refractory bradycardia and transient cardiac arrest occurred during the ART procedure and ECMO was used for maintaining her vital signs due to failed cardiopulmonary resuscitation.

Patient no. 3: a 34-year-old male patient who had a history of APE presented with transient syncope, palpitations, and dyspnoea. Severe pulmonary hypertension (>60 mmHg) and RVD were found at admission. Hypotension and dyspnoea were not alleviated after systemic thrombolysis for 24 hrs and his family agreed to ART therapy. ART was performed; refractory bradycardia and hypotension occurred during the ART procedure. A sudden transient cardiac arrest occurred when the ART procedure was about to be completed. Cardiopulmonary resuscitation combined with intra-aortic balloon pumping was performed.

Supplementary Table 1. Comparison of baseline clinical data between the intermediate-high-risk pulmonary embolism (IHR-PE) group and the high-risk pulmonary embolism (HR-PE) group.

	Total (n=44)	IHR-PE (n=23)	HR-PE (n=21)	*p*-value
Male	21 (47.7)	11 (47.8)	10 (47.6)	0.989
Age, years (mean±SD)	58.34±13.41	58.61±12.16	58.05±14.97	0.892
Risk factors for PE:				
Recent surgery	21 (47.7)	13 (56.5)	8 (38.1)	0.222
Malignancy	6 (13.6)	3 (13.0)	3 (14.3)	1.000
Immobilisation	3 (6.8)	2 (8.7)	1 (4.8)	1.000
Hypercoagulability	3 (6.8)	0 (0)	3 (14.3)	0.100
Recent trauma/fractures	3 (6.8)	2 (8.7)	1 (4.8)	1.000
Idiopathic	8 (18.2)	5 (21.7)	3 (14.3)	0.803
Main symptoms:				
Chest pain	8 (18.2)	7 (30.4)	1 (4.8)	0.070
Palpitations	4 (9.1)	3 (13.0)	1 (4.8)	0.668
Dyspnoea	13 (29.5)	8 (34.8)	5 (23.8)	0.426
Presyncope/syncope	19 (43.2)	4 (17.4)	15 (71.4)	0.001
Cardiac arrest	3 (6.8)	0 (0)	3 (14.3)	0.100
Thrombolytic contraindications:				
Absolute	4 (9.1)	1 (4.3)	3 (14.3)	0.535
Relative	30 (68.2)	13 (56.5)	17 (81.0)	0.157
Clinical presentation:				
Shock	11 (25)	0 (0)	11 (52.4)	0.000
Hypotension	10 (22.7)	0 (0)	10 (47.6)	0.000
PESI class 5	26 (59.1)	9 (39.1)	17 (81.0)	0.012
PESI class 4	15 (34.1)	13 (56.5)	2 (9.5)	0.003

Echocardiography:				
Right ventricular dilation (RV/LV >1)	38 (86.4)	20 (87.0)	18 (85.7)	1.000
Right ventricular hypokinesia	23 (52.3)	14 (60.9)	9 (42.9)	0.232
Tricuspid regurgitation	10 (22.7)	5 (21.7)	5 (23.8)	0.870
Abnormal interventricular septal motion	20 (45.5)	8 (34.8)	12 (57.1)	0.137
Computer tomography	41 (93.2)	23 (100)	18 (85.7)	0.100
Saddle emboli in CT angiography	36 (81.8)	15 (65.2)	21 (100)	0.004
DVT by sonographic examination	32 (72.7)	18 (78.3)	14 (66.7)	0.388
Troponin I >0.01 ng/mL at presentation	19 (43.2)	10 (43.5)	9 (42.9)	0.967
D-dimer >500 ng/mL at presentation	41 (93.2)	20 (87.0)	21 (100)	0.234
IVC filter deployed	31 (70.5)	17 (73.9)	14 (66.7)	0.599
Local infusions of fibrinolytic agent	40 (90.9)	22 (95.7)	18 (85.7)	0.535
ART treatment for DVT and PE simultaneously	19 (43.2)	13 (56.5)	6 (28.6)	0.062

ART: AngioJet rheolytic thrombectomy; DVT: deep vein thrombosis; IVC: inferior vena cava; PE: pulmonary embolism; PESI: pulmonary embolism severity index

Supplementary Table 2. The procedural results and follow-up data between patients who received the one-stop combined procedure (PE and DVT thrombectomy) and those who underwent only PE thrombectomy.

	Only PE treatment (n=25)	PE and DVT treatment (n=19)	*p*-value
Run time of ART (s)	142.12±57.10	175.68±57.49	0.061
Procedural time (min)	117.80±31.79	132.11±31.77	0.147

Contrast administration (ml)	126.20±21.52	144.47±29.29	0.022
Post-procedural major bleeding, n (%)	2 (8.0)	0 (0)	0.498
Procedure-related arrhythmia and hypotension, n (%)	11 (44.0)	5 (26.3)	0.227
Renal failure with haemodialysis, n (%)	4 (16.0)	2 (10.5)	0.936
In-hospital death, n (%)	3 (12.0)	3 (15.8)	1.000
Rivaroxaban use, n (%)	22 (88.0)	17 (89.5)	1.000
Warfarin use, n (%)	3 (12.0)	2 (10.5)	1.000
Extended anticoagulant >6 months, n (%)*	9 (36.0)	9 (47.4)	0.447
Post-thrombotic syndrome#, n (%)	0 (0)	4 (21.1)	0.029

* The extended (>6 months or no scheduled stop date) anticoagulant therapy was performed in patients who had residual DVT or PE on ultrasound or CT imaging after completing 6 months of anticoagulant therapy or in patients with cancer. # Post-thrombotic syndrome was not found in patients with only the PE treatment because of no extensive iliocaval or iliofemoral thrombus. All 35 surviving patients did not develop VTE recurrence during the follow-up.