

Supplementary Materials

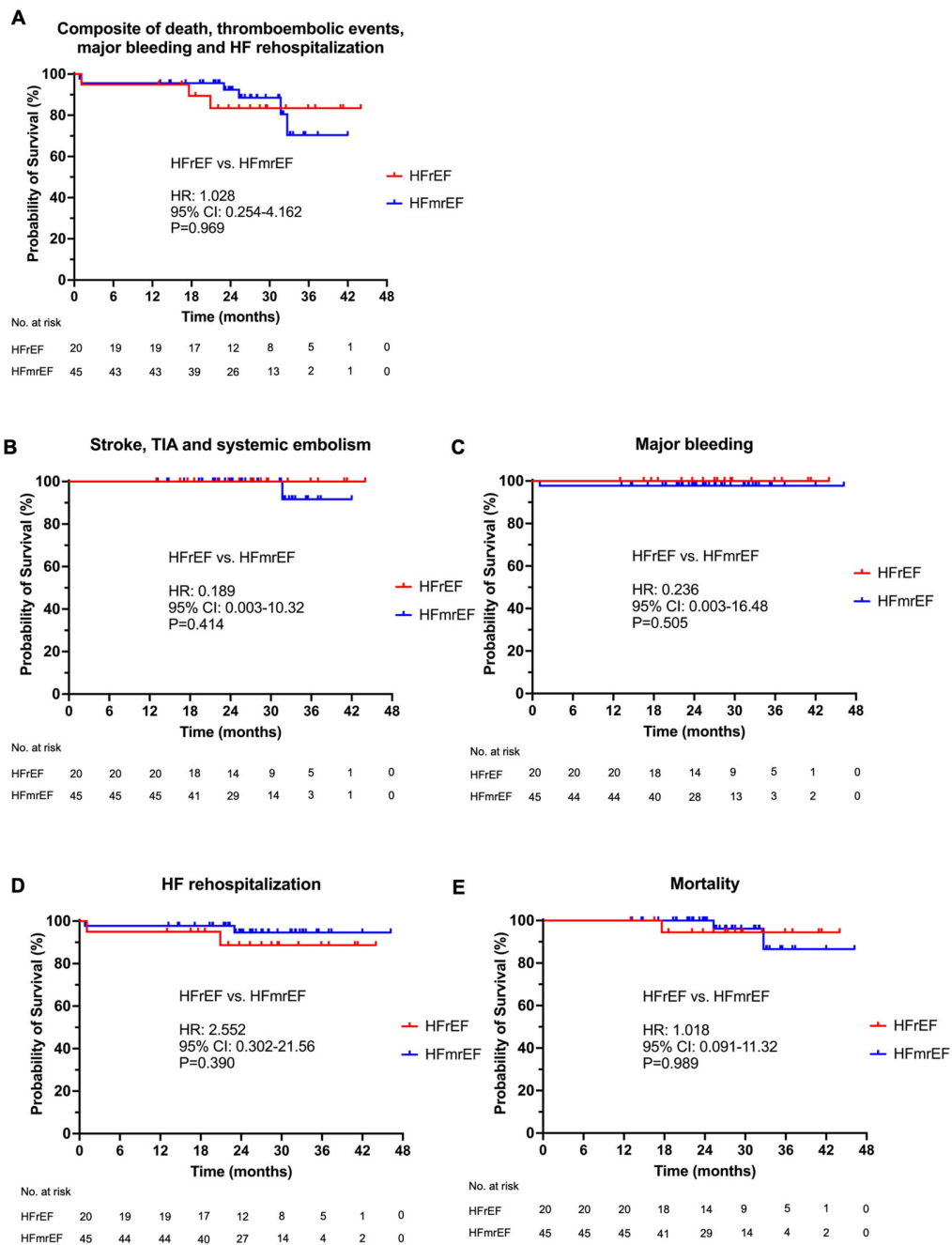


Figure S1. Time-to-event curves comparing AF patients with HFrEF and HFmrEF who underwent the combined RFCA+LAAC procedure. Time-to-event curves comparing AF patients complicating with HFrEF and HFmrEF who underwent combined RFCA and LAAC procedure in LAACablation registry. (A). Cumulative incidence of the composite of thromboembolic

events, major bleeding, heart failure rehospitalization, and death. (B). Cumulative incidence of thromboembolic events (strokes, transient ischemic attacks, and systemic embolism). (C). Cumulative incidence of major bleeding. (D). Cumulative incidence of heart failure rehospitalization. (E). Cumulative incidence of death. CI=confidence interval; HF=heart failure; HFmrEF= heart failure with mildly-reduced ejection fraction; HFrEF= heart failure with reduced ejection fraction; HR= hazard ratio; LAAC= left atrial appendage closure; RFCA= radiofrequency catheter ablation; TIA= transient ischemic attack.

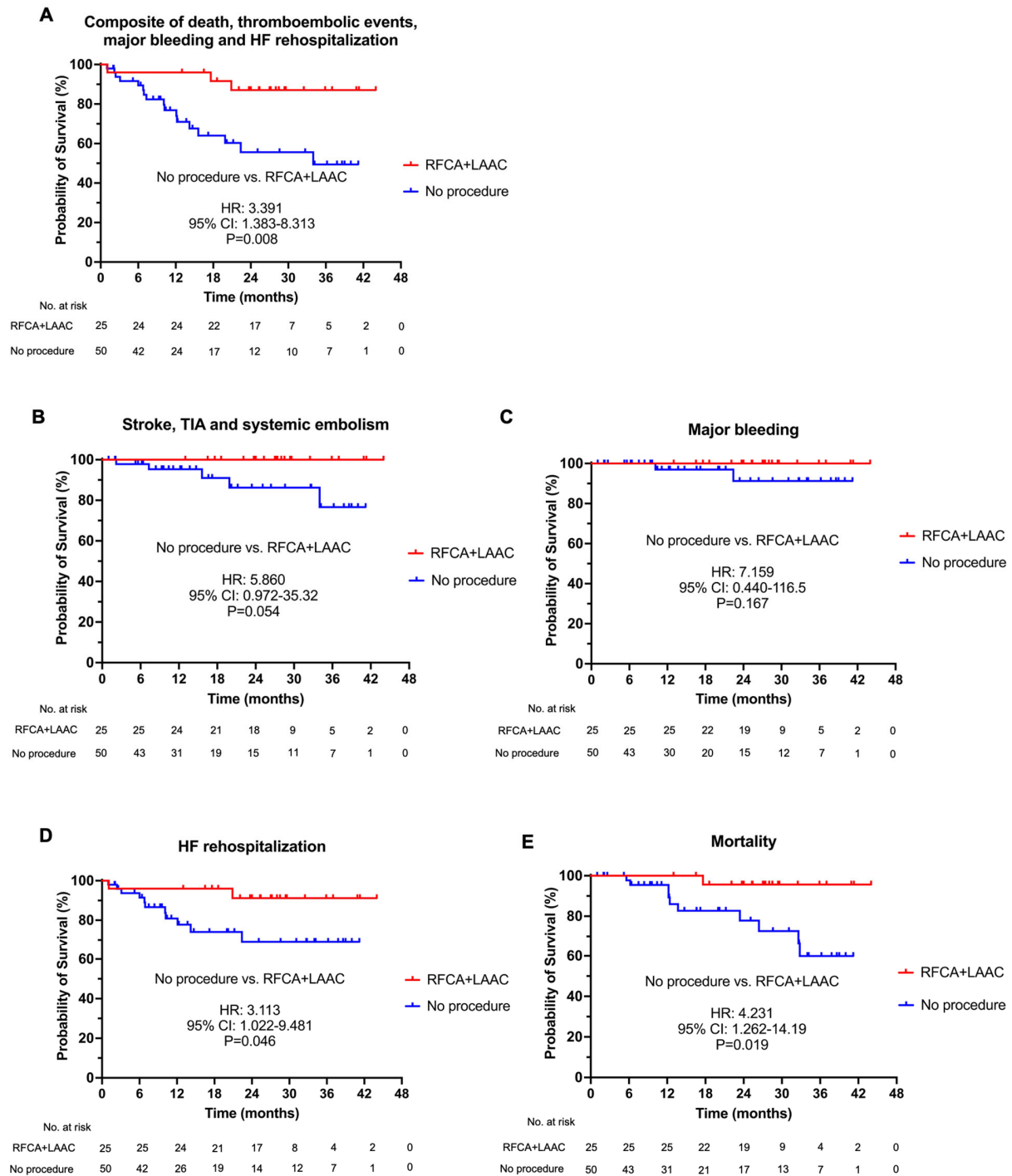


Figure S2. Time-to-event curves comparing between the procedural and non-procedural cohorts of AF-HFrEF patients. **(A).** Cumulative incidence of the composite of thromboembolic events, major bleeding, heart failure rehospitalization, and death. **(B).** Cumulative incidence of

thromboembolic events (strokes, TIA, and systemic embolism). **(C)**. Cumulative incidence of major bleeding. **(D)**. Cumulative incidence of heart failure rehospitalization. **(E)**. Cumulative incidence of death. CI=confidence interval; HF=heart failure; HFrEF= heart failure with reduced ejection fraction; HR= hazard ratio; LAAC= left atrial appendage closure; RFCA= radiofrequency catheter ablation; TIA= transient ischemic attack.

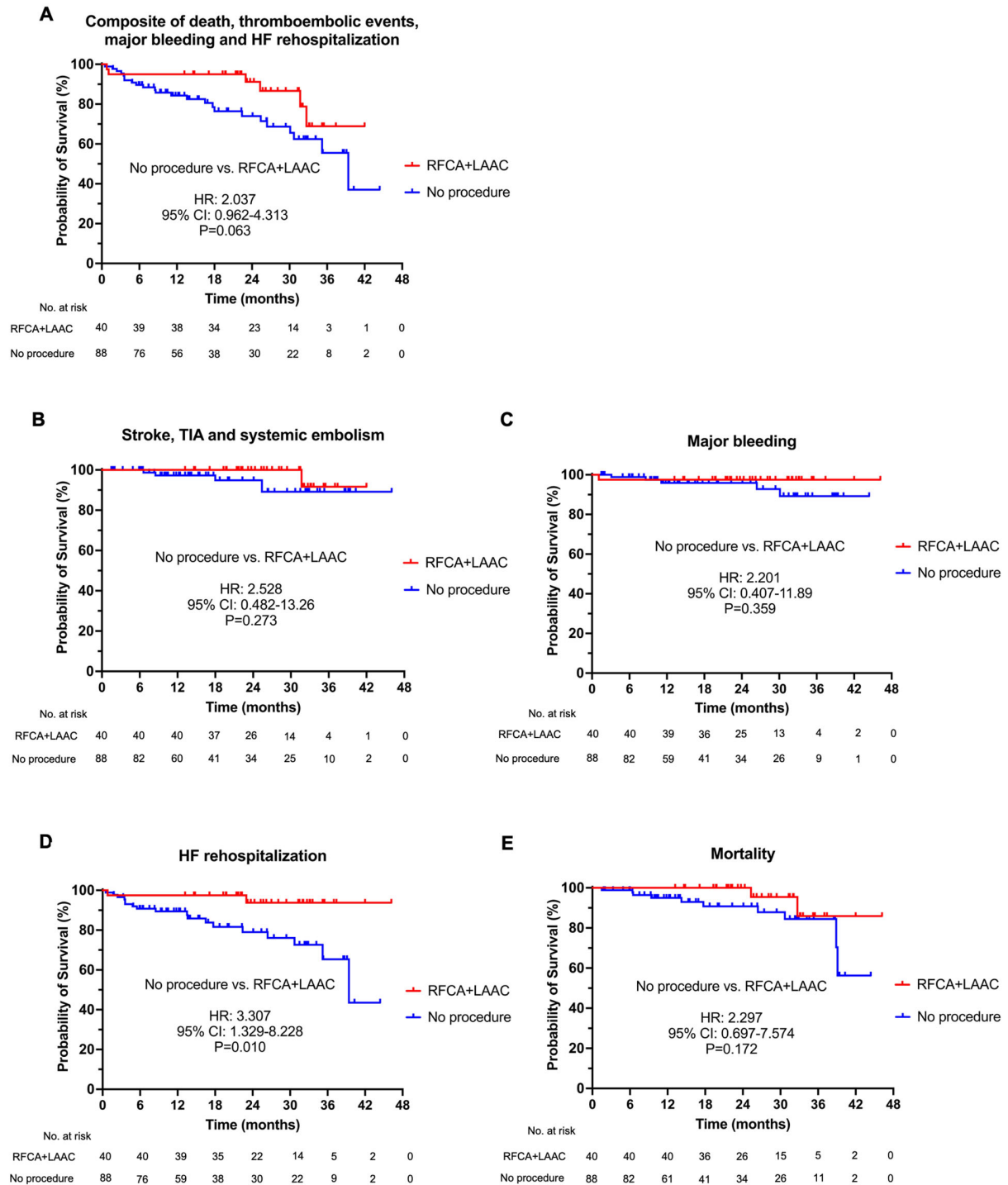


Figure S3. Time-to-event curves comparing between the procedural and non-procedural cohorts of AF-HFmrEF patients. (A). Cumulative incidence of the composite of thromboembolic events, major bleeding, heart failure rehospitalization, and death. (B). Cumulative incidence of

thromboembolic events (strokes, TIA, and systemic embolism). (C). Cumulative incidence of major bleeding. (D). Cumulative incidence of heart failure rehospitalization. (E). Cumulative incidence of death. CI=confidence interval; HF=heart failure; HFrEF= heart failure with reduced ejection fraction; HR= hazard ratio; LAAC= left atrial appendage closure; RFCA= radiofrequency catheter ablation; TIA= transient ischemic attack.

Table S1. The inclusion and exclusion criteria for the LAACablation registry.

| Inclusion criteria |
|--|
| <ul style="list-style-type: none"> 1) History of paroxysmal/persistent/longstanding persistent atrial fibrillation 2) Refractory to at least one antiarrhythmic drug, or unwilling to receive long-term antiarrhythmic medications 3) With contraindication of long-term anticoagulation, or unwilling to receive long-term anticoagulation 4) CHA₂DS₂-VASc score ≥ 2 and/or HAS-BLED score ≥ 3 5) With informed consent to participate in the study 6) Age between 18 and 90 years |
| Exclusion Criteria |
| <ul style="list-style-type: none"> 1) Myocardial infarction within 3 months 2) Stroke or systemic embolism within 3 months 3) With a plan to receive heart transplantation 4) Life expectancy less than 1 year 5) Severe bleeding diseases that cannot be treated with short-term anticoagulants 6) With left atrial or left atrial appendage thrombus 7) With uncontrolled malignant tumors 8) Obvious liver and kidney dysfunction (ALT, AST more than 2 times of the upper limit of normal, or CCr $<50\%$) 9) Women who are pregnant or breastfeeding. 10) Other conditions not suitable to receive the combined procedure evaluated by the operators. |

ALT, alanine transaminase; AST, aspartate aminotransferase; CCr, creatinine clearance normalized 1.73 m² body surface area

Table S2. Baseline characteristics between HF and AF patients underwent the combined RFCA+LAAC procedure and no procedure.

| Patient characteristics | Combined procedure (n=65) | No procedure (n=138) | P value |
|--|------------------------------|----------------------|---------|
| AF and HFrEF | 20 (30.8) | 54 (39.1) | 0.248 |
| AF and HFmrEF | 45 (69.2) | 84 (60.9) | 0.248 |
| Age | 67.3 ± 7.5 | 69.2 ± 9.9 | 0.172 |
| Age < 65 y | 17 (26.2) | 29 (21.0) | 0.319 |
| 65 y ≤ age < 75 y | 36 (55.4) | 77 (55.8) | 0.956 |
| Age ≥ 75y | 12 (18.5) | 32 (23.2) | 0.446 |
| Female | 18 (27.7) | 55 (39.9) | 0.092 |
| BMI (kg/m ²) | 25.7 ± 3.4 | 24.7 ± 3.5 | 0.056 |
| AF types | | | |
| Paroxysmal | 10 (15.4) | 36 (26.1) | 0.089 |
| Persistent/ long-standing persistent | 55 (84.6) | 102 (73.9) | 0.089 |
| CHA ₂ DS ₂ -VASc score | 3.9 ± 1.2 | 4.2 ± 1.5 | 0.159 |
| HAS-BLED score | 2.7 ± 1.0 | 2.8 ± 0.9 | 0.477 |
| NYHA class | | | |
| NYHA class II | 24 (36.9) | 41 (29.7) | 0.304 |
| NYHA class III | 37 (56.9) | 80 (58.0) | 0.888 |
| Ambulatory NYHA class IV | 4 (6.2) | 17 (12.3) | 0.222 |
| Hypertension | 51 (78.5) | 101 (73.2) | 0.419 |
| Diabetes mellites | 15 (23.1) | 37 (26.8) | 0.199 |
| Myocardial infarction | 2 (3.1) | 13 (9.4) | 0.151 |
| Cardiac revascularization [†] | 6 (9.2) | 19 (13.8) | 0.359 |

| | | | |
|---|----------------------|----------------------|--------|
| Hypertrophic cardiomyopathy | 4 (6.2) | 11 (8.0) | 0.778 |
| Left ventricular noncompaction cardiomyopathy | 2 (3.1) | 5 (3.6) | >0.999 |
| Obstructive sleep apnea | 4 (6.2) | 13 (9.4) | 0.590 |
| Chronic obstructive pulmonary disease | 3 (4.6) | 11 (8.0) | 0.555 |
| History of strokes/TIAs/SE | 13 (20.0) | 33 (23.9) | 0.534 |
| History of LAA thrombus | 6 (9.2) | 8 (5.8) | 0.367 |
| History of major bleeding | 11 (16.9) | 19 (13.8) | 0.555 |
| History of malignant tumor | 4 (6.2) | 18 (13.0) | 0.225 |
| History of chemotherapy | 3 (4.6) | 14 (10.1) | 0.278 |
| Pacemaker implantation | 3 (4.6) | 4 (2.9) | 0.682 |
| ICD/ CRT-D implantation | 2 (3.1) | 3 (2.2) | 0.656 |
| Current smoker | 23 (35.4) | 55 (39.9) | 0.541 |
| Echocardiographic parameters | | | |
| LVEF (%) | 42.6 ± 5.3 | 41.3 ± 4.6 | 0.075 |
| Left atrial diameter (mm) | 47.1 ± 5.0 | 48.2 ± 4.1 | 0.099 |
| LVEDD (mm) | 57.0 ± 6.6 | 57.2 ± 5.7 | 0.825 |
| LVEDSD (mm) | 44.1 ± 6.6 | 45.4 ± 5.8 | 0.156 |
| Estimated PASP (mmHg) | 34.3 ± 9.3 | 35.8 ± 7.4 | 0.218 |
| Pericardial effusion, mm‡ | 2.6 ± 1.2 | 2.8 ± 0.9 | 0.188 |
| NT-proBNP (pg/ml) | 1492 [809, 3259] | 1633 [833, 3713] | 0.481 |
| Troponin I (ng/ml) | 0.019 [0.009, 0.033] | 0.021 [0.010, 0.040] | 0.718 |
| Hemoglobin, g/L | 136 ± 14 | 133 ± 11 | 0.099 |
| Creatine, mmol/L | 76 ± 19 | 80 ± 15 | 0.106 |

Values are given as mean ± SD, median [25th percentile, 75th percentile], or n (%) as appropriate.

AF= atrial fibrillation; BMI= body mass index; CRT-D= cardiac resynchronization therapy with defibrillation;

ICD= implantable cardioverter defibrillator; LAA= left atrial appendage; LAAC= left atrial appendage closure;
LVEDD= left ventricular end-diastolic diameter; LVEF= left ventricular ejection fraction; LVESD= left ventricular
end-systolic diameter; NT-proBNP= N-terminal-proB-type natriuretic peptide; NYHA= New York Heart
Association; PASP= pulmonary artery systolic pressure; RFCA= radiofrequency catheter ablation; SE= systemic
embolism; TIA= transient ischemic attack;