

**Supplementary table 1.** Baseline characteristics

| Variables             | Total<br>(n = 1876) | Missing<br>value, n (%) | Development cohort<br>(n = 1261) | Validation cohort<br>(n = 615) | p value |
|-----------------------|---------------------|-------------------------|----------------------------------|--------------------------------|---------|
| Age, years            | 64.77 ± 10.70       | 0 (0)                   | 64.71 ± 10.50                    | 64.89 ± 11.11                  | 0.741   |
| Age ≥ 65 years, n (%) | 1012 (53.94)        | 0 (0)                   | 664 (52.66)                      | 348 (56.59)                    | 0.109   |
| Age ≥ 75 years, n (%) | 369 (19.67)         | 0 (0)                   | 244 (19.35)                      | 125 (20.33)                    | 0.618   |
| Female sex, n (%)     | 471 (25.11)         | 0 (0)                   | 314 (24.90)                      | 157 (25.53)                    | 0.769   |
| Weight, kg            | 64.39 ± 10.87       | 13 (0.69)               | 64.51 ± 10.85                    | 64.15 ± 10.91                  | 0.505   |
| SBP, mmHg             | 130.26 ± 21.03      | 3 (0.16)                | 130.60 ± 21.17                   | 129.55 ± 20.75                 | 0.305   |
| DBP, mmHg             | 76.07 ± 12.09       | 4 (0.21)                | 76.29 ± 12.06                    | 75.63 ± 12.14                  | 0.015   |
| HR, bpm               | 75.32 ± 14.17       | 3 (0.16)                | 75.30 ± 14.09                    | 75.61 ± 13.95                  | 0.652   |
| Medical history       |                     |                         |                                  |                                |         |
| Hypotension, n (%)    | 54 (2.89)           | 5 (0.27)                | 36 (2.86)                        | 18 (2.93)                      | 0.935   |
| CKD, n (%)            | 442 (23.56)         | 0 (0)                   | 293 (23.24)                      | 149 (24.23)                    | 0.635   |
| CKD stages            |                     | 0 (0)                   |                                  |                                | 0.100   |
| CKD G1, n (%)         | 555 (29.58)         |                         | 372 (29.50)                      | 183 (29.76)                    |         |
| CKD G2, n (%)         | 879 (46.86)         |                         | 596 (47.26)                      | 283 (46.02)                    |         |
| CKD G3, n (%)         | 385 (20.52)         |                         | 262 (20.78)                      | 123 (20.00)                    |         |
| CKD G4, n (%)         | 49 (2.61)           |                         | 29 (2.30)                        | 20 (3.25)                      |         |
| CKD G5, n (%)         | 8 (0.43)            |                         | 2 (0.16)                         | 6 (0.98)                       |         |
| LVEF, %               | 56.76 ± 13.16       | 228 (12.15)             | 56.86 ± 13.25                    | 56.55 ± 12.96                  | 0.655   |
| LVEF < 40%, n (%)     | 209 (12.68)         | 228 (12.15)             | 143 (12.72)                      | 66 (12.60)                     | 0.943   |

|                                  |               |             |               |               |       |
|----------------------------------|---------------|-------------|---------------|---------------|-------|
| Heart function<br>(NYHA class)   |               | 0 (0)       |               |               | 0.444 |
| II, n (%)                        | 1162 (61.94)  |             | 770 (61.06)   | 392 (63.74)   |       |
| III, n (%)                       | 158 (8.42)    |             | 112 (8.88)    | 46 (7.48)     |       |
| IV, n (%)                        | 29 (1.55)     |             | 18 (1.43)     | 11 (0.87)     |       |
| Heart function (Killip<br>class) |               | 0 (0)       |               |               | 0.333 |
| II, n (%)                        | 417 (22.23)   |             | 292 (23.16)   | 125 (20.33)   |       |
| III, n (%)                       | 71 (3.78)     |             | 44 (3.49)     | 27 (4.39)     |       |
| IV, n (%)                        | 39 (2.08)     |             | 25 (1.98)     | 14 (2.28)     |       |
| Hypertension, n (%)              | 1151 (61.39)  | 1 (0.05)    | 788 (62.54)   | 363 (59.02)   | 0.142 |
| Hyperlipidemia, n (%)            | 252 (13.43)   | 0 (0)       | 182 (14.43)   | 70 (11.38)    | 0.069 |
| Hypoalbuminemia, n<br>(%)        | 811 (47.34)   | 163 (8.69)  | 539 (46.75)   | 272 (48.57)   | 0.478 |
| Anemia, n (%)                    | 661 (35.73)   | 26 (1.39)   | 432 (34.84)   | 229 (37.54)   | 0.254 |
| AMI, n (%)                       | 527 (28.23)   | 9 (0.48)    | 361 (28.72)   | 166 (27.21)   | 0.498 |
| Diabetes, n (%)                  | 497 (26.51)   | 1 (0.05)    | 331 (26.25)   | 166 (27.04)   | 0.717 |
| CAD, n (%)                       | 1743 (93.31)  | 8 (0.43)    | 1172 (93.39)  | 571 (93.15)   | 0.847 |
| Laboratory examination           |               |             |               |               |       |
| LDL-C, mmol/L                    | 2.69 ± 0.94   | 318 (16.95) | 2.69 ± 0.96   | 2.70 ± 0.91   | 0.964 |
| HDL-C, mmol/L                    | 1.01 ± 1.74   | 318 (16.95) | 1.04 ± 2.12   | 0.95 ± 0.25   | 0.187 |
| SCr, μmol/L                      | 96.86 ± 50.73 | 0 (0)       | 95.51 ± 45.86 | 99.64 ± 59.43 | 0.129 |

|                                      |                 |             |                 |                 |       |
|--------------------------------------|-----------------|-------------|-----------------|-----------------|-------|
| eGFR, mL/min/1.73<br>mm <sup>2</sup> | 77.40 ± 25.84   | 0 (0)       | 77.53 ± 25.23   | 77.15 ± 27.06   | 0.774 |
| Hemoglobin, g/L                      | 131.68 ± 16.94  | 114 (6.08)  | 132.20 ± 17.13  | 130.61 ± 16.49  | 0.06  |
| HbA1c, %                             | 6.60 ± 1.34     | 416 (22.17) | 6.62 ± 1.38     | 6.57 ± 1.25     | 0.471 |
| Medications                          |                 |             |                 |                 |       |
| ACEI/ARB, n (%)                      | 1636 (87.21)    | 0 (0)       | 1091 (86.52)    | 545 (88.62)     | 0.201 |
| Beta blocker, n (%)                  | 1570 (83.73)    | 1 (0.05)    | 1060 (84.13)    | 510 (82.93)     | 0.509 |
| Statin, n (%)                        | 1797 (95.84)    | 1 (0.05)    | 1215 (96.35)    | 582 (94.79)     | 0.112 |
| Diuretics, n (%)                     | 428 (22.83)     | 1 (0.05)    | 288 (22.86)     | 140 (22.76)     | 0.964 |
| Procedure                            |                 |             |                 |                 |       |
| PCI, n (%)                           | 1234 (69.44)    | 99 (5.28)   | 853 (71.08)     | 381 (66.03)     | 0.030 |
| Hydration volume, mL                 | 813.27 ± 472.63 | 32 (1.71)   | 816.77 ± 467.72 | 806.08 ± 482.88 | 0.652 |
| Contrast volume, mL                  | 131.82 ± 67.17  | 0 (0)       | 134.38 ± 68.22  | 126.58 ± 64.70  | 0.016 |
| Contrast volume ≥ 100mL, n (%)       | 1393 (74.25)    | 0 (0)       | 950 (75.34)     | 443 (72.03)     | 0.124 |
| Contrast volume ≥ 200mL, n (%)       | 343 (18.28)     | 0 (0)       | 245 (19.43)     | 98 (15.93)      | 0.066 |
| Mehran Score                         | 5.24 ± 4.66     | 30 (1.60)   | 5.15 ± 4.60     | 5.44 ± 4.78     | 0.220 |
| Peri-procedure IABP, n (%)           | 99 (5.28)       | 0 (0)       | 61 (4.84)       | 38 (6.18)       | 0.223 |

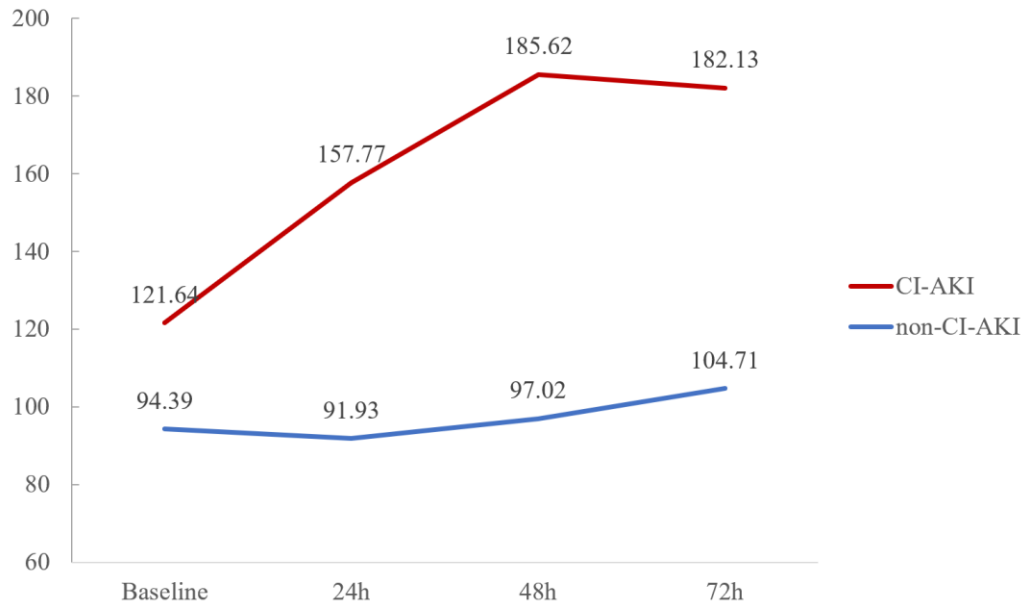
Abbreviations: CI-AKI: contrast-induced acute kidney injury; SBP: systolic blood pressure; DBP: diastolic blood pressure; HR: heart rate; LVEF: left ventricular ejection fraction; CKD: chronic kidney disease; NYHA: New York Heart Association; AMI : acute myocardial infarction; CAD: coronary artery disease; LDL-C: low density lipoprotein-C; HDL-C: high density lipoprotein-C; SCr: serum creatinine; eGFR: estimate glomerular filtration rate; ACEI: angiotensin-converting enzymes inhibitors; ARB: angiotensin-receptor blockers; PCI: percutaneous coronary intervention; IABP: intra-aortic balloon pump;

**Supplementary table 2.** C-Statistic and Hosmer-Lemeshow statistic of the nomogram in patients with different stages of congestive heart failure and stages of chronic kidney disease

| Stages                             | C-statistic (95% CI)  | Hosmer-Lemeshow statistic |         |
|------------------------------------|-----------------------|---------------------------|---------|
|                                    |                       | $\chi^2$                  | P value |
| CKD G1                             | 0.736 (0.638 - 0.834) | 7.362                     | 0.498   |
| CKD G2                             | 0.777 (0.713 – 0.840) | 6.961                     | 0.541   |
| CKD G3                             | 0.708 (0.636 – 0.779) | 6.005                     | 0.647   |
| CKD G4&5                           | 0.699 (0.559 – 0.839) | 4.344                     | 0.739   |
| Heart function (NYHA/Killip class) |                       |                           |         |
| II                                 | 0.797 (0.754 – 0.840) | 3.525                     | 0.897   |
| III                                | 0.745 (0.650 – 0.839) | 12.752                    | 0.121   |
| IV                                 | 0.647 (0.510 – 0.783) | 12.966                    | 0.113   |

Abbreviations: CKD: chronic kidney disease; NYHA: New York Heart Association;

**Supplementary Figure 1.** The distribution of the serum creatinine value within 24-72 hours after the procedure



|                                 | <b>24h</b> | <b>48h</b> | <b>72h</b> |
|---------------------------------|------------|------------|------------|
| SCr missing in CI-AKI group     | 20.59 %    | 17.06 %    | 64.12 %    |
| SCr missing in non-CI-AKI group | 9.20 %     | 51.82 %    | 86.69 %    |

**Supplementary Figure 2.** Risk of contrast-induced acute kidney injury according to the total nomogram score categories.

