**Supplementary Materials**

**Table S1.** Descriptivestatisticson variables in the original dataset with less that 20% of missing values (except the variables selected by Lasso procedure which are reported in the main text) stratified by death status (N=701).

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | ***Alive (N=536)*** | ***Dead (N=165)*** |  |
| **N** |  | **N** |  | ***p-value*** |
| **Sex (male)** | 536 | 361 (67.4) | 165 | 126 (76.4) | *0.036c* |
| **Smoker (ever)** | 451 | 117 (25.9) | 141 | 45 (31.9) | *0.200c* |
| **Hypertension** | 532 | 284 (53.4) | 164 | 114 (69.5) | *<0.001c* |
| **Dyslipidaemia** | 531 | 122 (23.0) | 164 | 71 (43.3) | *<0.001c* |
| **Diabetes** | 532 | 117 (22.0) | 164 | 45 (27.4) | *0.181c* |
| **Heart failure** | 532 | 55 (10.3) | 164 | 38 (23.2) | *<0.001c* |
| **Atrial fibrillation** | 532 | 65 (12.2) | 164 | 41 (25.0) | *<0.001c* |
| **Coronary artery disease** | 532 | 93 (17.5) | 164 | 55 (33.5) | *<0.001c* |
| **Prior cardiac surgery or percutaneous valve treatment** | 532 | 51 (9.6) | 164 | 20 (12.2) | *0.414c* |
| **Prior heart transplantation/LVAD** | 532 | 3 (0.6) | 164 | 1 (0.6) | *1.000d* |
| **Chronic obstructive pulmonary disease** | 532 | 44 (8.3) | 164 | 24 (14.6) | *0.024c* |
| **Chronic kidney disease (eGFR<60 ml/min/m2)** | 532 | 72 (13.5) | 164 | 56 (34.1) | *<0.001c* |
| **Prior ACEi/ARB therapy** | 501 | 180 (35.9) | 157 | 74 (47.1) | *0.015c* |
| **Prior anticoagulant therapy** | 496 | 64 (12.9) | 154 | 28 (18.2) | *0.131c* |
| **Prior Beta Blockers** | 499 | 172 (34.5) | 157 | 78 (49.7) | *0.001c* |
| **Temperature (°C)** | 526 | 37.2±1.0 | 162 | 37.3±1.0 | *0.333a* |
| **SBP (mmHg)** | 525 | 131±22 | 163 | 127±22 | *0.030a* |
| **DBP (mmHg)** | 525 | 76±13 | 163 | 72±13 | *0.002a* |
| **Heart rate (bpm)** | 525 | 86±18 | 162 | 89±19 | *0.077a* |
| **Red blood cell count (x10^6/μL)** | 531 | 4.50 (4.10-4.89) | 163 | 4.28 (3.77-4.78) | *0.001b* |
| **Haemoglobin (g/dl)** | 529 | 13.4 (12.0-14.4) | 162 | 12.8 (11.0-14.1) | *0.006b* |
| **Haematocrit (%)** | 529 | 39.2 (35.6-42.6) | 161 | 37.7 (33.6-42.1) | *0.031b* |
| **White blood cell count (per μL)** | 531 | 6750 (5085-9055) | 163 | 7890 (5000-11045) | *0.015b* |
| **Lymphocytes absolute (per μL)** | 477 | 1000 (700-1331) | 148 | 755 (500-1000) | *<0.001b* |
| **Platelets count, (x10^3/μL)** | 529 | 209 (161-276) | 162 | 191 (145-251) | *0.014b* |
| **Serum creatinine (mg/dl)** | 525 | 0.94 (0.77-1.20) | 160 | 1.17 (0.90-1.92) | *<0.001b* |
| **Serum sodium (mEq/L)** | 525 | 138 (135-140) | 159 | 138 (135-141) | *0.128b* |
| **Serum potassium (mEq/L)** | 522 | 4.0 (3.6-4.3) | 159 | 3.9 (3.6-4.3) | *0.813b* |
| **CRP (mg/dL)** | 495 | 46 (12-114) | 158 | 106 (28-178) | *<0.001b* |
| **Bilirubin (mg/dL)** | 475 | 0.6 (0.4-0.8) | 145 | 0.6 (0.4-0.8) | *0.978b* |
| **Aspartate transaminase (U/L)** | 512 | 38 (24-61) | 161 | 48 (32-69) | *0.001b* |
| **Lactate dehydrogenase (U/L)** | 432 | 335 (241-483) | 134 | 432 (294-642) | *<0.001b* |
| **INR** | 478 | 1.1 (1.0-1.2) | 153 | 1.1 (1.0-1.3) | *0.037b* |
| **ABG test pH** | 470 | 7.47 (7.43-7.50) | 148 | 7.46 (7.42-7.49) | *0.154b* |
| **ABG test pCO2 (mmHg)** | 446 | 33 (30-37) | 143 | 32 (29-36) | *0.279b* |

Data shown as mean±standard deviation, median (IQR), or count (%).

*a* t-test; *b* Wilcoxon test; *c* Chi-squared test; d Fisher’s Exact test

**Legend:** ABG: arterial blood gas, ACEi: angiotensin converting enzyme inhibitor, ARB: angiotensin receptor blocker, CRP: c-reactive protein, DBP diastolic blood pressure, eGFR: estimated glomerular filtration rate, INR International Normalized Ratio, LVAD: left ventricular assist device, PCO2: partial pressure of carbon dioxide, SBP: Systolic blood pressure.

**Table S2.** Details on the setting of the parameters of the ML algorithms used in the paper

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| --- |
| **Algorithms** |
| **missForest** | * **Number of interactions**: 5
* **Number of trees**: 1000
* **Number of variables used at each node**: $\sqrt{\# var in the model}$
* **Replace**: true
 |
| **Lasso** | * **Elastic mixing parameter**:Lasso
* **Lambda**: **0.07**
* **Family**: Binomial
* **Standardize**: true
 |
| **Random Forest (RF)** | * **Number of trees**: 10000
* **Number of variables used at each node**: $\sqrt{\# var in the model}$
* **Type**: regression
* **Replace**: true
 |
| **Gradient Boosting Machine (GBM)** | * **Number of trees**: 10000
* **Interaction depth (number of splits in a tree)**: 1 (stump tree)
* **Shrinkage**: 0.001
* **Cross-validations folds**: 10
 |