**Supplementary Table 1.** Description of Variables Used to Predict Cardiac Complications in Random Forests Analyses

|  |  |
| --- | --- |
| Variable | Definition |
| age | Age in Years, ≥60 years |
| sex | Male or Female |
| BMI | Body Mass Index was calculated as weight/height2 (kg/m^2) |
| HTN | Hypertension Status (Yes / No), defined as blood pressure ≥140/90 mmHg or previous diagnosis of hypertension and currently under treatment |
| duration of HTN | Duration of hypertension (0-20 years />20 years) of patients with HTN |
| grades of HTN | Grades of hypertension (Grade 1HTN, Grade 2HTN, Grade 3HTN) of patients with hypertension |
| cardiovascular risk categories | Cardiovascular risk categories (low risk, moderate risk, high risk, very high risk) of patients with hypertension |
| number of antihypertension drugs | Number of antihypertension drugs (continuous variable) of patients with hypertension |
| CAD | Presence of coronary artery disease (Yes / No) |
| current angina | Indication of participant's current angina status (two weeks) (Yes / No) |
| history of MI | History of myocardial infraction (Yes / No) |
| history of stent placement | History of stent placement (Yes / No) |
| position of stent implantation | Position of stent implantation (coronary artery / peripheral artery) |
| number of stent implantation | Number of stent implantation (continuous variable) |
| duration of stent placement | Duration of stent placement (0-10 years />10 years) |
| diabetes mellitus | Parental Diabetes History (Yes / No) |
| duration of diabetes mellitus | Duration of diabetes mellitus (0-10 years />10 years) of patients with diabetes mellitus |
| use of insulin | Use of insulin (Yes / No) of patients with diabetes mellitus |
| FBG | Fasting blood Glucose (<8 / ≥8 mmol/l) of patients with diabetes mellitus |
| history of CABG | History of coronary artery bypass graft (Yes / No) |
| history of cardiac pacemaker insertion | History of cardiac pacemaker insertion (Yes / No) |
| history of lacunar infarction | History of lacunar infarction (Yes / No) |
| history of stroke | History of stroke (Yes / No) |
| history of heart valve replacement | History of heart valve replacement (Yes / No) |
| cardiac arrhythmia | Presence of cardiac arrhythmia (Yes / No) |
| history of radiofrequency ablation | History of radiofrequency ablation (Yes / No) |
| Hypertrophic cardiomyopathy | Presence of cardiomyopathy (Yes / No) |
| congenital heart disease | Presence of congenital heart disease (Yes / No) |
| rheumatic heart disease | Presence of rheumatic heart disease (Yes / No) |
| peripheral artery disease | Presence of peripheral vascular disease (Yes / No) |
| NYHA functional class | New York Heart Association (NYHA) functional class (I, II, III, IV) |
| number of extracted teeth | Number of extracted teeth (continuous variable) |
| number of extracted teeth with periodontitis | Number of extracted teeth with periodontitis (continuous variable) |
| number of impacted teeth | Number of impacted teeth (continuous variable) |
| number of residual root or residual crown or decayed tooth | Number of residual root or residual crown or decayed tooth (continuous variable) |
| history of oral antibiotic use prior to dental extraction | History of oral antibiotic prior use to dental extraction (Yes / No) |
| SBP | Systolic Blood Pressure (continuous variable/mmHg) |
| DBP | Diastolic Blood Pressure (continuous variable/mmHg) |
| heart rate | Heart rate (continuous variable/bmp) |
| ST - segment depression | ECG determined ST - segment depression (Yes, No) |
| T wave change | ECG determined T wave change (Yes / No) |
| bundle branch block | ECG determined bundle branch block (Yes / No) |
| pathological Q wave | ECG determined pathological Q wave (Yes / No) |
| atrial fibrillation | ECG determined atrial fibrillation (Yes / No) |
| premature beat | ECG determined premature beat (Yes / No) |
| LVEF | Doppler echocardiography determined left ventricular ejection fraction (continuous variable/%) |
| E/A ratio | A measure of diastolic dysfunction, E/A ratio (≥1 / <1) |
| PAH | Doppler echocardiography determined pulmonary arterial hypertension (Yes / No) |
| left atrial diameter | Doppler echocardiography determined left atrial diameter (continuous variable/mm) |
| LVEDD | Doppler echocardiography determined left ventricular end-diastolic dimension (continuous variable/mm) |
| LVESD | Doppler echocardiography determined left ventricular end-systolic dimension (continuous variable/mm) |
| cardiothoracic ratio ≥0.5 | X-ray chest radiography determined cardiothoracic ratio ≥0.5 (Yes / No) |
| aortic arteriosclerosis | X-ray chest radiography determined aortic arteriosclerosis (Yes / No) |

**Abbreviation:**

BMI - body mass index

HTN - hypertension

CAD - coronary artery disease

MI - myocardial infarction

FBG - fasting blood glucose

CABG - coronary artery bypass graft

SBP - systolic blood pressure

DBP - diastolic blood pressure

LVEF - left ventricular ejection fraction

ECG - electrocardiographic

PAH - pulmonary arterial hypertension

LVEDD - left ventricular end-diastolic dimension

LVESD - left ventricular end-systolic dimension

**SupplementaryTable 2.** Variable coefficients of LASSO binary logistic regression

|  |  |
| --- | --- |
| **Variable** | **Coefficient** |
| Current angina (two weeks) | 1.5162 |
| Rheumatic heart disease | 1.0514 |
| Atrial fibrillation | 0.8844 |
| Number of impacted teeth | 0.8243 |
| History of cardiac pacemaker insertion | 0.7429 |
| Pulmonary arterial hypertension | 0.5691 |
| Use of insulin (yes) | 0.5416 |
| NYHA functional class (III) | 0.5098 |
| Grade 3hypertension | 0.5022 |
| History of oral antibiotic prior to dental extraction | 0.3957 |
| ST - segment depression | 0.2438 |
| Age | 0.0492 |
| Systolic blood pressure | 0.0420 |
| Heart rate | 0.0235 |
| Left atrial diameter | 0.0054 |
| Hypertension | 0 |
| Grade 2hypertension | 0 |
| Grades of hypertension (no hypertension) | 0 |
| Cardiovascular risk categories (high risk) | 0 |
| Cardiovascular risk categories (very high risk) | 0 |
| Cardiovascular risk categories (no hypertension) | 0 |
| Duration of hypertension (＞20 years) | 0 |
| Duration of hypertension (no hypertension) | 0 |
| Coronary artery disease | 0 |
| Duration of diabetes mellitus (＞10 years) | 0 |
| Duration of diabetes mellitus (no diabetes mellitus) | 0 |
| Use of insulin (no diabetes mellitus) | 0 |
| Fasting blood-glucose level (≥8 mmol/l) | 0 |
| Fasting blood-glucose level (normal) | 0 |
| Cardiac arrhythmia | 0 |
| NYHA functional class (II) | 0 |
| Number of extracted teeth with periodontitis | 0 |
| T wave change | 0 |
| E/A ratio (>1) | 0 |
| E/A ratio (missing) | 0 |
| Pulmonary arterial hypertension (missing) | 0 |
| . Cardiothoracic ratio ≥0.5 | 0 |
| Cardiothoracic ratio ≥0.5 (missing) | 0 |
| Aortic arteriosclerosis | 0 |
| Aortic arteriosclerosis (missing) | 0 |

At the highest AUROC score of 85.67%（SD, 0.0103; 95%CI, 84.64%—86.71%）in the LASSO binary logistic regression, λ = 0.01350117. There were 15 predictors with estimated coefficients.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Supplementary Table 3.** Baseline Characteristics of Patients | | | | | | |
|  | Variables |  | Total (%) | No cardiac complications  (n = 474; 78.61%) | Cardiac complications  (n = 129; 21.39%) | p value |
|  | Age |  | 603 | 71.35±8.22 (13.0) | 76.16±7.52 (12.0) | < 0.001 |
|  | Body mass index |  | 603 | 23.85±3.30 (4.1) | 24.13±3.43 (4.0) | 0.304 |
|  | Number of antihypertension drugs |  | 456 | 1.36±0.67 (2.75) | 1.26±0.77 (2.0) | 0.171 |
|  | Number of stent implantation |  | 140 | 1.99±1.30 (2.0) | 2.06±1.19 (2.0) | 0.573 |
|  | Number of extracted teeth |  | 603 | 1.46±0.63 (1.0) | 1.54±0.64 (1.0) | 0.112 |
|  | Number of extracted teeth with periodontitis |  | 603 | 0.37±0.69 (1.0) | 0.26±0.67 (0.0) | 0.026 |
|  | Number of impacted teeth |  | 603 | 0.08±0.29 (0.0) | 0.20±0.46 (0.0) | <0.001 |
|  | Number of residual root or residual crown or decayed tooth |  | 603 | 1.00±0.84 (2.0) | 1.08±0.85 (2.0) | 0.329 |
|  | Systolic blood pressure |  | 603 | 141.90±15.31 (21.75) | 157.26±17.67 (23.0) | <0.001 |
|  | Diastolic blood pressure |  | 603 | 73.60±10.90 (15.0) | 75.02±10.42 (12.0) | 0.184 |
|  | Heart rate |  | 603 | 76.02±10.98 (15.0) | 80.02±12.77 (15.0) | 0.003 |
|  | LVEF |  | 375 | 62.73±4.66 (4.7) | 61.63±5.91 (5.85) | 0.155 |
|  | Left atrial diameter |  | 373 | 38.53±5.44 (5.0) | 40.18±6.26 (7.825) | 0.015 |
|  | LVEDD |  | 373 | 52.23±4.91 (6.7) | 52.22±4.90 (6.675) | 0.978 |
|  | LVESD |  | 373 | 34.53±4.04 (4.9) | 34.65±4.29 (4.45) | 0.86 |
|  | Sex |  | 603 |  |  | 0.948 |
|  |  | Male |  | 222(46.8%) | 60(46.5%) |  |
|  |  | Female |  | 252(53.2%) | 69(53.5%) |  |
|  | Hypertension |  | 603 |  |  | 0.016 |
|  |  | Yes |  | 348(73.4%) | 108(83.7%) |  |
|  |  | No |  | 126(26.6%) | 21(16.3%) |  |
|  | Duration of hypertension |  | 603 |  |  | <0.001 |
|  |  | 0~20 |  | 249(52.5%) | 57(44.2%) |  |
|  |  | ＞20 |  | 99(20.9%) | 51(39.5%) |  |
|  |  | No hypertension |  | 126(26.6%) | 21(16.3%) |  |
|  | Grades of hypertension |  | 603 |  |  | <0.001 |
|  |  | Grade 1hypertension |  | 91(19.2%) | 8(6.2%) |  |
|  |  | Grade 2hypertension |  | 153(32.3%) | 38(29.5%) |  |
|  |  | Grade 3hypertension |  | 104(21.9%) | 62(48.1%) |  |
|  |  | No hypertension |  | 126(26.6%) | 21(16.3%) |  |
|  | Cardiovascular risk categories |  | 603 |  |  | 0.004 |
|  |  | moderate risk |  | 63(13.3%) | 8(6.2%) |  |
|  |  | high risk |  | 44(9.3%) | 16(12.4%) |  |
|  |  | very high risk |  | 241(50.8%) | 84(65.1%) |  |
|  |  | No hypertension |  | 126(26.6%) | 21(16.3%) |  |
|  | Coronary artery disease |  | 603 |  |  | 0.039 |
|  |  | Yes |  | 198(41.8%) | 67(51.9%) |  |
|  |  | No |  | 276(58.2%) | 62(48.1%) |  |
|  | Current angina (two weeks) |  | 603 |  |  | <0.001 |
|  |  | Yes |  | 17(3.6%) | 37(28.7%) |  |
|  |  | No |  | 457(96.4%) | 92(71.3%) |  |
|  | History of myocardial infraction |  | 603 |  |  | 0.306 |
|  |  | Yes |  | 64(13.5%) | 22(17.1%) |  |
|  |  | No |  | 410(86.5%) | 107(82.9%) |  |
|  | History of stent placement |  | 603 |  |  | 0.235 |
|  |  | Yes |  | 105(22.2%) | 35(27.1%) |  |
|  |  | No |  | 369(77.8%) | 94(72.9%) |  |
|  | Position of stent placement |  | 603 |  |  | 0.051 |
|  |  | coronary artery |  | 102(21.5%) | 31(24.0%) |  |
|  |  | peripheral artery |  | 3(0.6%) | 4(3.1%) |  |
|  |  | No stent placement |  | 369(77.8%) | 94(72.9%) |  |
|  | Duration of stent placement |  | 603 |  |  | 0.151 |
|  |  | 0~10 |  | 94(19.8%) | 28(21.7%) |  |
|  |  | ＞10 |  | 11(2.3%) | 7(5.4%) |  |
|  |  | No stent placement |  | 369(77.8%) | 94(72.9%) |  |
|  | Diabetes mellitus |  | 603 |  |  | 0.271 |
|  |  | Yes |  | 117(24.7%) | 38(29.5%) |  |
|  |  | No |  | 357(75.3%) | 91(70.5%) |  |
|  | Duration of diabetes mellitus |  | 603 |  |  | 0.039 |
|  |  | 0~10 |  | 64(13.5%) | 13(10.1%) |  |
|  |  | ＞10 |  | 53(11.2%) | 25(19.4%) |  |
|  |  | No diabetes mellitus |  | 357(75.3%) | 91(70.5%) |  |
|  | Use of insulin |  | 603 |  |  | 0.024 |
|  |  | Yes |  | 19(4.0%) | 13(10.1%) |  |
|  |  | No |  | 98(20.7%) | 25(19.4%) |  |
|  |  | No diabetes mellitus |  | 357(75.3%) | 91(70.5%) |  |
|  | Fasting blood-glucose level |  | 603 |  |  | 0.621 |
|  |  | Normal |  | 357(75.3%) | 91(71.1%) |  |
|  |  | ＜8 |  | 107(22.6%) | 34(26.6%) |  |
|  |  | ≥8 |  | 10(2.1%) | 3(2.3%) |  |
|  | History of CABG |  | 603 |  |  | 0.848 |
|  |  | Yes |  | 10(2.1%) | 3(2.3%) |  |
|  |  | No |  | 464(97.9%) | 126(97.7%) |  |
|  | History of cardiac pacemaker insertion |  | 603 |  |  | 0.035 |
|  |  | Yes |  | 24(5.1%) | 13(10.1%) |  |
|  |  | No |  | 450(94.9%) | 116(89.9%) |  |
|  | History of lacunar infarction |  | 603 |  |  | 0.977 |
|  |  | Yes |  | 73(15.4%) | 20(15.5%) |  |
|  |  | No |  | 401(84.6%) | 109(84.5%) |  |
|  | History of stroke |  | 603 |  |  | 0.560 |
|  |  | Yes |  | 40(8.4%) | 13(10.1%) |  |
|  |  | No |  | 434(91.6%) | 116(89.9%) |  |
|  | Cardiac arrhythmia |  | 603 |  |  | 0.003 |
|  |  | Yes |  | 121(25.5%) | 50(38.8%) |  |
|  |  | No |  | 353(74.5%) | 79(61.2%) |  |
|  | History of heart valve replacement |  | 603 |  |  | 0.122 |
|  |  | Yes |  | 11(2.3%) | 7(5.4%) |  |
|  |  | No |  | 463(97.7%) | 122(94.6%) |  |
|  | History of radiofrequency ablation |  | 603 |  |  | 0.779 |
|  |  | Yes |  | 7(1.5%) | 3(2.3%) |  |
|  |  | No |  | 467(98.5%) | 126(97.7%) |  |
|  | Hypertrophic cardiomyopathy |  | 603 |  |  | 0.533 |
|  |  | Yes |  | 5(1.1%) | 0(0.0%) |  |
|  |  | No |  | 469(98.9%) | 129(100.0%) |  |
|  | Congenital heart disease |  | 603 |  |  | 1 |
|  |  | Yes |  | 3(0.6%) | 0(0.0%) |  |
|  |  | No |  | 471(99.4%) | 129(100.0%) |  |
|  | Rheumatic heart disease |  | 603 |  |  | 0.02 |
|  |  | Yes |  | 9(1.9%) | 8(6.2%) |  |
|  |  | No |  | 465(98.1%) | 121(93.8%) |  |
|  | Peripheral artery disease |  | 603 |  |  | 0.066 |
|  |  | Yes |  | 5(1.1%) | 5(3.9%) |  |
|  |  | No |  | 469(98.9%) | 124(96.1%) |  |
|  | NYHA functional class |  | 603 |  |  | <0.001 |
|  |  | I |  | 270(57.0%) | 43(33.3%) |  |
|  |  | II |  | 197(41.6%) | 74(57.4%) |  |
|  |  | III |  | 7(1.5%) | 12(9.3%) |  |
|  | History of oral antibiotic use prior to dental extraction |  | 603 |  |  | 0.001 |
|  |  | Yes |  | 254(53.6%) | 90(69.8%) |  |
|  |  | No |  | 220(46.4%) | 39(30.2%) |  |
|  | ST - segment depression |  | 603 |  |  | <0.001 |
|  |  | Yes |  | 75(15.8%) | 42(32.6%) |  |
|  |  | No |  | 399(84.2%) | 87(67.4%) |  |
|  | T wave change |  | 603 |  |  | 0.002 |
|  |  | Yes |  | 87(18.4%) | 40(31.0%) |  |
|  |  | No |  | 387(81.6%) | 89(69.0%) |  |
|  | Bundle branch block |  | 603 |  |  | 0.827 |
|  |  | Yes |  | 66(13.9%) | 17(13.2%) |  |
|  |  | No |  | 408(86.1%) | 112(86.8%) |  |
|  | Pathological Q wave |  | 603 |  |  | 0.321 |
|  |  | Yes |  | 9(1.9%) | 5(3.9%) |  |
|  |  | No |  | 465(98.1%) | 124(96.1%) |  |
|  | Atrial fibrillation |  | 603 |  |  | <0.001 |
|  |  | Yes |  | 20(4.2%) | 18(14.0%) |  |
|  |  | No |  | 454(95.8%) | 111(86.0%) |  |
|  | Premature beat |  | 603 |  |  | 0.061 |
|  |  | Yes |  | 46(9.7%) | 20(15.5%) |  |
|  |  | No |  | 428(90.3%) | 109(84.5%) |  |
|  | E/A ratio |  | 603 |  |  | 0.001 |
|  |  | ≤1 |  | 197(41.6%) | 67(51.9%) |  |
|  |  | >1 |  | 79(16.7%) | 31(24.0%) |  |
|  |  | Missing |  | 198(41.8%) | 31(24.0%) |  |
|  | Pulmonary arterial hypertension |  | 603 |  |  | <0.001 |
|  |  | Yes |  | 30(6.3%) | 27(20.9%) |  |
|  |  | No |  | 246(51.9%) | 71(55.0%) |  |
|  |  | Missing |  | 198(41.8%) | 31(24.0%) |  |
|  | Cardiothoracic ratio ≥0.5 |  | 603 |  |  | <0.001 |
|  |  | Yes |  | 63(13.3%) | 14(10.9%) |  |
|  |  | No |  | 137(28.9%) | 17(13.2%) |  |
|  |  | Missing |  | 274(57.8%) | 98(76.0%) |  |
|  | Aortic arteriosclerosis |  | 603 |  |  | 0.001 |
|  |  | Yes |  | 16(3.4%) | 4(3.1%) |  |
|  |  | No |  | 184(38.8%) | 27(20.9%) |  |
|  |  | Missing |  | 274(57.8%) | 98(76.0%) |  |

Data were N (%) or mean±standard deviation (IQR). Continuous variables used T-test or Mann-Whitney U test and Categorical variables used chi-squared test or Fisher's exact test for compare the baseline characteristics of dental extraction with cardiac complications and without cardiac complications.

**Abbreviations:**

CABG - coronary artery bypass graft

LVEF - left ventricular ejection fraction

LVEDD - left ventricular end-diastolic dimension

LVESD - left ventricular end-systolic dimension

**Supplementary contents: parameter of RF model**

RandomForestClassifier (bootstrap=True, class\_weight=None, criterion='gini',

max\_depth=5, max\_features='sqrt', max\_leaf\_nodes=None,

min\_impurity\_decrease=0.0, min\_impurity\_split=None,

min\_samples\_leaf=2, min\_samples\_split=3,

min\_weight\_fraction\_leaf=0.0, n\_estimators=50, n\_jobs=-1,

oob\_score=False, random\_state=2018, verbose=0,

warm\_start=False).