**Table 1:** Baseline demographics of patients with and without CABG history

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **No CABG history (n=527,121)** | **CABG history****(n=59,644)** | **p-value** |
| Age (years) ±SD | 64.8±11.8 | 69.1±9.5 | <0.001 |
| Male, no. (%) | 390,036 (74) | 49, 231 (83) | <0.001 |
| Hypertension, no. (%) | 267,540 (52) | 37,682 (68) | <0.001 |
| Diabetes, no. (%) | 97,251 (19) | 18,114 (32) | <0.001 |
| Previous MI, no. (%) | 139,558 (28) | 33,203 (62) | <0.001 |
| Previous stroke, no. (%) | 19,318 (4) | 3,511 (7) | <0.001 |
| Peripheral vascular disease, no. (%) | 23,666 (5) | 5,572 (10) | <0.001 |
| Valvular heart disease, no. (%) | 6,475 (1) | 1,629 (3) | <0.001 |
| Renal disease, no. (%) | 13,252 (3) | 2,614 (5) | <0.001 |
| Previous PCI, no. (%) | 114,311 (23) | 23,679 (41) | <0.001 |
| Anticoagulant treatment, no. (%) | 5,166 (1) | 1,224 (2) | <0.001 |
| Ejection fraction <30%, no. (%) | 15,337 (6) | 2,798 (9) | <0.001 |

**Table 2:** Baseline participant characteristics variables for patients undergoing PCI with a prior history of CABG tabulated by coronary perforation status and target vessel type

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Native Vessel PCI** | **Graft PCI** |  |
| **Variable** | **No perforation (n=40,988)** | **Perforation****(n=210)** | ***p*** | **No perforation (n=16,921)** | **Perforation****(n=83)** | ***p*** | ***p\**** |
| Age (years) | 68.6±9.6 | 72.0±8.4 | <0.001 | 70.2±9.1 | 72.1±8.5 | 0.029 | 0.500 |
| Female, no. (%) | 7,472 (18.3) | 52 (24.8) | 0.020 | 2,454 (14.6) | 17 (20.5) | 0.172 | 0.449 |
| Smoking history, no. (%) | 22,106 (62.4) | 116 (61.7) | 0.903 | 9,197 (63.4) | 49 (65.3) | 0.920 | 0.602 |
| BMI (kg/m2) | 28.7±4.9 | 28.0±3.9 | 0.076 | 28.3±4.7 | 27.4±3.9 | 0.102 | 0.271 |
| Hypertension, no. (%) | 25,660 (67.2) | 146 (73.7) | 0.059 | 10,603 (68.2) | 53 (67.9) | 0.966 | 0.405 |
| Diabetes, no. (%) | 12,223 (31.5) | 51 (25.4) | 0.072 | 5,224 (33.1) | 28 (34.1) | 0.929 | 0.110 |
| Previous MI, no. (%) | 21,856 (58.9) | 133 (66.8) | 0.028 | 9,977 (66.3) | 53 (68.8) | 0.725 | 0.995 |
| Previous stroke, no. (%) | 2,233 (5.8) | 13 (6.6) | 0.781 | 1,079 (6.9) | 14 (17.9) | <0.001 | 0.016 |
| PVD, no. (%) | 3,537 (9.3) | 19 (9.6) | 0.968 | 1,782 (11.5) | 11 (14.1) | 0.580 | 0.290 |
| Valve disease, no. (%) | 1,180 (3.1) | 3 (1.5) | 0.284 | 409 (2.6) | 4 (5.1) | 0.309 | 0.103 |
| Renal disease, no. (%) | 1,731 (4.6) | 11 (5.5) | 0.662 | 795 (5.2) | 4 (5.1) | 0.955 | 1.000 |
| Stable indication, no. (%) | 24,707 (60.3) | 146 (69.5) | 0.008 | 7,184 (42.5) | 25 (30.1) | 0.031 | <0.001 |
| Shock, no. (%) | 515 (1.4) | 5 (2.8) | 0.207 | 231 (1.5) | 2 (2.8) | 0.693 | 1.000 |
| Q wave on ECG, no (%) | 5901 (18.3) | 31 (18.5) | 0.958 | 2,767 (22.3) | 15 (22.4) | 0.435 | 0.481 |
| Previous PCI, no. (%) | 16,120 (40.0) | 82 (39.6) | 0.870 | 6,896 (42.4) | 32 (40.0) | 0.775 | 1.000 |
| Anticoagulation, no. (%) | 870 (2.3) | 7 (3.5) | 0.375 | 313 (2.1) | 2 (2.5) | 0.795 | 1.000 |
| CCS class | 2.48±0.95 | 2.67±0.80 | 0.003 | 2.61±0.84 | 2.78±0.83 | 0.105 | 0.311 |
| NYHA class | 2.04±0.86 | 2.12±0.92 | 0.124 | 2.08±0.82 | 2.32±0.86 | 0.043 | 0.190 |

p\*= comparison between perforation in native vessel and graft

**Table 3:** Procedural variables by coronary perforation status and target vessel type

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Native Vessel PCI** | **Graft PCI** |  |
| **Variable** | **No perforation (n=40,988)** | **Perforation****(n=210)** | ***p*** | **No perforation (n=16,921)** | **Perforation****(n=83)** | ***p*** | ***p\**** |
| Femoral access, no. (%) | 27,790 (70.0) | 139 (67.8) | 0.552 | 12,462 (76.4) | 61 (74.4) | 0.767 | 0.266 |
| Dual access, no. (%) | 1,718 (4.3) | 28 (13.7) | <0.001 | 418 (2.6) | 4 (4.9) | 0.331 | 0.038 |
| No. grafts present ±SD | 2.54±0.94 | 2.66±0.82 | 0.063 | 2.94±0.92 | 3.01±0.77 | 0.329 | 0.033 |
| No. grafts patent ±SD | 1.52±0.92 | 1.52±1.04 | 0.497 | 2.01±1.05 | 2.03±1.0 | 0.442 | 0.002 |
| CTO present, no. (%) | 18,655 (53.6) | 141 (75.0) | <0.001 | 8,881 (72.2) | 49 (68.1) | 0.594 | 0.222 |
| No. CTO present ±SD | 0.82±0.90 | 1.21±0.96 | <0.001 | 1.44±1.15 | 1.24±1.09 | 0.063 | 0.081 |
| Trainee operator, no. (%) | 8,865 (23.8) | 28 (14.1) | 0.002 | 3,841 (25.5) | 18 (22.8) | 0.668 | 0.108 |
| CTO attempted, no. (%) | 5,080 (13.4) | 83 (40.5) | <0.001 | 808 (5.9) | 6 (7.8) | 0.492 | <0.001 |
| Vessel attempted, no. (%)GraftLeft mainLADCircumflexRight coronary | 0 (0)7,455 (19.2)10,110 (26.0)14,803 (38.1)13,124 (33.8) | 0 (0)42 (20.7)49 (24.1)65 (32.1)91 (44.8) | -0.6540.5930.0870.001 | 16,921 (100)0 (0)0 (0)0 (0)0 (0) | 83 (100)0 (0)0 (0)0 (0)0 (0) | ----- | ----- |
| Rotablation, no. (%) | 1,595 (4.3) | 24 (12.1) | <0.001 | 46 (0.3) | 2 (2.5) | 0.014 | 0.012 |
| Laser atherectomy, no. (%) | 165 (0.4) | 2 (1.0) | 0.516 | 175 (1.2) | 2 (2.5) | 0.564 | 0.319 |
| Penetration catheter, no. (%) | 327 (0.8) | 2 (1.0) | 0.851 | 47 (0.3) | 0 (0) | 0.615 | 1.000 |
| Micro-catheter, no. (%) | 666 (1.8) | 16 (8.0) | <0.001 | 56 (3.8) | 0 (0) | 0.583 | 0.008 |
| Thrombectomy, no. (%) | 1,269 (3.4) | 8 (4.1) | 0.740 | 1,458 (9.8) | 12 (14.2) | 0.184 | 0.003 |
| Distal protection, no. (%) | 392 (1.0) | 1 (0.5) | 0.681 | 2,843 (18.9) | 15 (18.8) | 0.967 | <0.001 |
| Cutting balloon use, no. (%) | 1,575 (4.2) | 4 (2.2) | 0.167 | 510 (3.4) | 1 (1.3) | 0.448 | 0.495 |
| Bivalirudin use, no. (%) | 507 (1.3) | 1 (0.5) | 0.464 | 281 (1.9) | 1 (1.3) | 0.683 | 0.629 |
| GPI use, no. (%) | 5,317 (14.2) | 15 (7.7) | 0.013 | 3,641 (24.3) | 16 (21.6) | 0.692 | 0.005 |
| No. of stents used ±SD | 1.49±1.14 | 1.88±1.80 | <0.001 | 1.34±0.98 | 2.15±1.49 | <0.001 | 0.158 |
| No. of successful lesions ±SD | 1.29±0.81 | 1.07±0.99 | <0.001 | 1.13±0.64 | 1.28±10.3 | 0.017 | 0.231 |
| Largest stent/balloon ±SD | 3.27±0.69 | 3.36±0.83 | 0.055 | 3.60±0.78 | 3.76±0.86 | 0.046 | 0.001 |
| Longest stent used ±SD | 25.5±16.8 | 30.7±26.1 | <0.001 | 24.1±14.9 | 31.1±18.2 | <0.001 | 0.384 |

p\*= comparison between perforation in native vessel and graft

**Table 4:** Multivariate model of the significant associations between covariates and coronary perforation

|  |
| --- |
| **Native Vessel PCI** |
| **Variable** | **Adjusted odds ratio [95% CI]** | **p-value** |
| Age per year | 1.04 [1.02-1.06] | <0.001 |
| Chronic total occlusion attempted | 3.48 [2.30-5.27] | <0.001 |
| Number stents used | 1.31 [1.15-1.48] | <0.001 |
| Hypertension | 2.31 [1.40-3.80] | 0.001 |
| Rotational atherectomy use | 2.25 [1.29-3.93] | 0.004 |
| Female gender | 1.63 [1.07-2.50] | 0.024 |
| Diabetes mellitus | 0.55 [0.35-0.86] | 0.008 |
| **Graft PCI** |
| **Variable** | **Adjusted odds ratio [95% CI]** | **p-value** |
| Number stents used | 1.49 [1.01-1.36] | <0.001 |
| History of stroke | 1.56 [1.17-2.10] | 0.003 |
| NYHA class  | 2.14 [1.18-3.92] | 0.014 |

**Table 5:** Outcomes by coronary perforation status

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **No perforation (n=59,335)** | **Perforation** **(n=309)** | **p-value** |
| **Immediate procedural complications** |
| Tamponade, no. (%) | 0 (0) | 27 (10.0) | <0.001 |
| Shock induced by procedure, no. (%) | 89 (0.2) | 11 (3.6) | <0.001 |
| Heart block, no. (%) | 103 (0.2) | 6 (1.9) | <0.001 |
| Emergency cardiac surgery, no. (%) | 63 (0.1) | 4 (1.5) | <0.001 |
| Coronary dissection, no. (%) | 1,076 (2.0) | 35 (11.3) | <0.001 |
| Major side-branch loss, no. (%) | 269 (0.5) | 10 (3.2) | <0.001 |
| Slow flow, no. (%) | 664 (1.2) | 10 (3.2) | 0.004 |
| Access site complication, no. (%) | 418 (0.7) | 6 (2.0) | 0.017 |
| **Clinical outcomes** |
| Transfusion, no. (%) | 101 (0.2) | 10 (3.7) | <0.001 |
| Q wave MI, no. (%) | 96 (0.2) | 8 (2.9) | <0.001 |
| Non-Q wave MI, no. (%) | 246 (0.4) | 15 (5.6) | <0.001 |
| Renal failure, no. (%) | 67 (0.1) | 3 (1.1) | <0.001 |
| In-hospital major bleed, no. (%) | 513 (0.9) | 38 (14.0) | <0.001 |
| In-hospital death, no. (%) | 644 (1.1) | 30 (10.0) | <0.001 |
| Mortality at 30 days, no. (%) | 855 (1.7) | 28 (10.8) | <0.001 |
| Mortality at 1 year, no. (%) | 2,936 (6.3) | 41 (17.7) | <0.001 |

**Table 6:** Univariate odds of adverse outcomes by coronary perforation status

|  |  |  |  |
| --- | --- | --- | --- |
| **Adverse outcome** | **Odds ratio** |  **[95% CI]** | **p-value** |
| Emergency cardiac surgery | 13.43 | [4.85-37.15] | <0.001 |
| Access site complication | 2.95 | [1.31-6.65] | <0.001 |
| Transfusion | 21.40 | [11.05-41.46] | <0.001 |
| Q-wave MI | 17.88 | [8.60-37.15] | <0.001 |
| Non-Q wave MI | 13.41 | [7.85-22.90] | <0.001 |
| Renal failure | 9.44 | [2.95-30.18] | <0.001 |
| In-hospital major bleed | 17.73 | [12.45-25.26] | <0.001 |
| In-hospital death | 9.78 | [6.67-14.37] | <0.001 |
| Death 30-days | 7.13 | [4.79-10.61] | <0.001 |
| Death 1-year | 3.18 | [2.26-4.46] | <0.001 |