**SUPPLEMENTARY TABLE 1. Missing values of baseline and surgical characteristics of the study population.**

|  |  |
| --- | --- |
| Characteristic | **N=1146** |
| Age |  |
| Male gender | 0 |
| Hypertension | 0 |
| History of aortic aneurysm | 0 |
| Connective tissue disease | 0 |
| Diabetes mellitus | 0 |
| History of stroke | 0 |
| Chronic kidney disease | 0 |
| COPD | 0 |
| DeBakey type 1 | 0 |
| Intramural hematoma | 0 |
| Hypotensive shock | 0 |
| Cardiac arrest | 0 |
|  |  |
| Malperfusion  - Cardiac malperfusion  - Cerebral malperfusion  - Renal malperfusion  - Gastrointestinal malperfusion  - Peripheral malperfusion | 0  104  124  124  124  124 |
| Penn Class  - Aa  - Ab  - Ac  - Abc | 0 |
|  |  |
| Proximal surgical technique  - Supracoronary graft  - Supracoronary graft + AVR  - Bentall procedure | 0 |
| Distal surgical technique  - Ascending aorta  - Hemiarch procedure  - Arch procedure | 14 |
| CPB time, min | 96 |
| Cross-clamp time, min | 124 |
| HCA time, min | 251 |
| Lowest core temperature, °C | 122 |

Values are expressed as the number of missing cases.

**SUPPLEMENTARY TABLE 2. Missing values on early mortality and postoperative complications in the study population.**

|  |  |
| --- | --- |
| Characteristic | **N= 1146** |
| Intraoperative mortality | 0 |
| 30-day mortality | 3 |
| In-hospital mortality | 3 |
|  |  |
| Major bleeding | 0 |
| Reoperation for bleeding | 31 |
| Perioperative MI | 33 |
| Postoperative stroke | 29 |
| Postoperative coma | 144 |
| RRT | 34 |
| Mesenteric ischemia | 153 |
| DSWI | 45 |
| Acute limb ischemia | 41 |
| Ventilatory support > 48 h | 45 |
| Cardiac tamponade | 31 |
| Postoperative CKMB, | 451 |
| Postoperative Lactate, mmol/L | 493 |
| Length of stay in ICU, days | 303 |

Values are expressed as number of missing cases.

**SUPPLEMENTARY TABLE 3. Baseline and surgical characteristics of the study population, stratified by blood group.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | **O**  **(N= 465)** | **A**  **(N= 499)** | **B**  **(N=130)** | **AB**  **(N=52)** |
| Age | 61.3 ± 12.2 | 61.3 ± 12.1 | 62.6 ± 12.3 | 62.6 ± 11.2 |
| Male gender | 322 (69.2) | 336 (67.3) | 87 (66.9) | 30 (57.7) |
| Hypertension | 226 (48.6) | 264 (52.9) | 78 (60.0) | 28 (53.8) |
| History of aortic aneurysm | 42 (9.0) | 42 (8.4) | 17 (13.1) | 7 (13.5) |
| Connective tissue disease | 25 (5.4) | 20 (4.0) | 7 (5.4) | 2 (3.8) |
| Diabetes mellitus | 11 (2.4) | 10 (2.0) | 2 (1.5) | 3 (5.8) |
| History of stroke | 23 (4.9) | 20 (4.0) | 2 (1.5) | 0 (0) |
| Chronic kidney disease | 10 (2.2) | 9 (1.8) | 1 (0.8) | 1 (1.9) |
| COPD | 29 (6.2) | 27 (5.4) | 7 (5.4) | 5 (9.6) |
| DeBakey type 1 | 341 (73.3) | 372 (74.5) | 96 (73.8) | 34 (65.4) |
| Intramural hematoma | 37 (8.0) | 43 (8.6) | 0 (6.9) | 2 (3.8) |
| Hypotensive shock | 87 (18.7) | 101 (20.2) | 30 (23.1) | 15 (28.8) |
| Cardiac arrest | 20 (4.3) | 24 (4.8) | 9 (6.9) | 4 (7.7) |
|  |  |  |  |  |
| Malperfusion  - Cardiac malperfusion  - Cerebral malperfusion  - Renal malperfusion  - Gastrointestinal malperfusion  - Peripheral malperfusion | 147 (31.6)  39 (9.0)  38 (9.1)  20 (4.8)  20 (3.3)  71 (17.0) | 168 (33.7)  43 (9.6)  32 (7.2)  34 (7.7)  14 (3.2)  96 (21.8) | 48 (36.9)  8 (6.7)  16 (13.6)  9 (7.6)  5 (4.2)  27 (22.9) | 15 (28.8)  4 (8.9)  3 (6.8)  1 (2.3)  1 (2.3)  9 (20.5) |
| Penn Class  - Aa  - Ab  - Ac  - Abc | 254 (54.6)  105 (22.6)  81 (17.4)  25 (5.4) | 271 (54.3)  125 (25.1)  80 (16.0)  23 (4.6) | 67 (51.5)  31 (23.8)  20 (15.4)  12 (9.2) | 29 (55.8)  9 (17.3)  12 (23.1)  2 (3.8) |
|  |  |  |  |  |
| Proximal surgical technique  - Supracoronary graft  - Supracoronary graft + AVR  - Bentall procedure | 331 (71.2)  12 (2.6)  106 (22.8) | 351 (70.3)  9 (1.8)  115 (23.0) | 83 (63.8)  9 (6.9)  35 (26.9) | 38 (73.1)  2 (3.8)  10 (19.2) |
| Distal surgical technique  - Ascending aorta  - Hemiarch procedure  - Arch procedure | 330 (71.3)  104 (22.5)  24 (5.2) | 355 (72.6)  98 (20.0)  28 (5.7) | 85 (66.4)  33 (25.8)  9 (7.0) | 39 (75.0)  9 (17.3)  4 (7.7) |
| CPB time, min | 188 (157 - 230) | 194 (155 - 239) | 196 (153 - 253) | 188 (153 - 234) |
| Cross-clamp time, min | 88 (63 - 126) | 94 (67 - 133) | 99 (71 - 142) | 94 (67 - 122) |
| HCA time, min | 26 (20 - 34) | 27 (20 - 36) | 28.5 (21 - 37) | 27 (20 - 36) |
| Lowest core temperature, °C | 19 (18 - 24) | 19 (18 -24) | 20 (18 - 24) | 20 (18 - 24) |

Values are expressed as number (percentage), as median (interquartile range (IQR), or mean (± standard deviation (SD)). COPD: chronic obstructive pulmonary disease; AVR: aortic valve replacement; CPB: cardiopulmonary bypass; HCA: hypothermic circulatory arrest.

**SUPPLEMENTARY TABLE 4. Early mortality and postoperative complications in the population, stratified by blood group.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | **O**  **(N= 465)** | **A**  **(N= 499)** | **B**  **(N=130)** | **AB**  **(N=52)** |
| Intraoperative mortality | 25 (5.4) | 43 (8.6) | 13 (10.0) | 3 (5.8) |
| 30-day mortality | 80 (17.2) | 92 (18.5) | 22 (16.9) | 6 (11.5) |
| In-hospital mortality | 74 (15.9) | 81 (16.3) | 23 (17.7) | 6 (11.5) |
|  |  |  |  |  |
| Major bleeding | 173 (37.2) | 213 (42.7) | 51 (39.2) | 11 (21.2) |
| Reoperation for bleeding | 85 (18.7) | 114 (23.6) | 25 (19.8) | 5 (9.8) |
| Perioperative MI | 30 (6.6) | 31 (6.4) | 6 (4.8) | 4 (7.7) |
| Postoperative stroke | 68 (14.8) | 76 (15.8) | 24 (19.0) | 8 (15.7) |
| Postoperative coma | 45 (11.1) | 40 (9.0) | 13 (12.0) | 6 (12.8) |
| RRT | 46 (10.1) | 60 (12.4) | 15 (12.1) | 8 (15.7) |
| Mesenteric ischemia | 23 (5.7) | 25 (5.7) | 5 (4.5) | 1 (2.2) |
| DSWI | 3 (0.7) | 19 (4.0) | 1 (0.8) | 3 (6.0) |
| Acute limb ischemia | 13 (2.9) | 23 (4.8) | 6 (4.9) | 1 (2.0) |
| Ventilatory support > 48 h | 131 (29.0) | 160 (33.5) | 44 (36.1) | 17 (34.0) |
| Cardiac tamponade | 65 (14.3) | 69 (14.2) | 21 (16.9) | 3 (5.9) |
| Postoperative CKMB | 26 (15 - 43) | 24 (14 - 42) | 28 (16 - 64) | 32 (17 - 65) |
| Postoperative Lactate, mmol/L | 2.9 (2.1 - 4.3) | 3.0 (2.1 - 4.2) | 3.3 (2.2 - 4.6) | 3.1 (2.2 - 4.2) |
| Length of stay in ICU, days | 3 (2-7) | 4 (2-7) | 4 (2-9) | 3 (2-5) |

Values are expressed as number (percentage), or as median (IQR).

MI: myocardial infarction; RRT: renal replacement therapy; DSWI: deep sternal wound infection; ICU: intensive care unit.

**SUPPLEMENTARY TABLE 5. Univariable and multivariable logistic regression analysis for independent predictors of 30 day mortality.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | **Univariable analysis**  **OR (95% CI)** | ***p*** | **Multivariable analysis**  **OR (95% CI)** | ***p*** |
| Age | 1.012 (0.999 - 1.025) | 0.074 |  |  |
| Male gender | 0.944 (0.683 - 1.306) | 0.729 |  |  |
| Hypertension | 1.478 (1.084 - 2.016) | 0.014 |  |  |
| History of aortic aneurysm | 1.007 (0.598 - 1.695) | 0.978 |  |  |
| Connective tissue disease | 0.590 (0.249 - 1.399) | 0.231 |  |  |
| Diabetes mellitus | 3.601 (1.628 - 7.962) | 0.002 | 3.929 (1.499 - 10.299) | 0.005 |
| History of stroke | 1.365 (0.665 - 2.805) | 0.397 |  |  |
| Chronic kidney disease | 1.486 (0.538 - 4.103) | 0.445 |  |  |
| COPD | 2.237 (1.305 - 3.834) | 0.003 | 2.705 (1.446 - 5.060) | 0.002 |
| DeBakey type 1 | 1.432 (0.990 - 2.071) | 0.056 |  |  |
| Intramural hematoma | 0.847 (0.469 - 1.529) | 0.581 |  |  |
| Hypotensive shock | 2.106 (1.497 - 2.964) | <0.001 |  |  |
| Cardiac arrest | 3.474 (1.998 - 6.040) | <0.001 | 3.368 (1.803 - 6.290) | <0.001 |
| Malperfusion | 3.017 (2.208 - 4.122) | <0.001 | 2.759 (1.936 - 3.933) | <0.001 |
| Proximal surgical technique  - Supracoronary graft  - Supracoronary graft + AVR  - Bentall procedure | ref.  2.800 (1.292 - 6.071)  1.851 (1.306 - 2.624) | 0.009  0.001 |  |  |
| Distal surgical technique  - Ascending aorta  - Hemiarch procedure  - Arch procedure | ref.  0.850 (0.565 - 1.278)  2.168 (1.230 - 3.820) | 0.434  0.007 |  |  |
| CPB-time, min | 1.007 (1.005 - 1.009) | <0.001 | 1.007 (1.005 - 1.009) | <0.001 |
| Blood group O (vs Non-O) | 0.966 (0.708 - 1.319) | 0.829 | 1.030 (0.720 - 1.473) | 0.871 |
| Blood group   * O * A * B * AB | ref.  1.096 (0.787 - 1.525)  0.980 (0.584 - 1.645)  0.628 (0.259 - 1.520) | 0.587  0.940  0.302 | ref.  1.105 (0.757 - 1.613)  0.743 (0.400 - 1.378)  0.447 (0.154 - 1.302) | 0.606  0.346  0.140 |

Values are expressed as Hazard ratios (HR:s) and 95% Confidence intervals (CI)

COPD: chronic obstructive pulmonary disease; AVR: aortic valve replacement; CPB: cardiopulmonary bypass; Variables with p<0.100 included in multivariable analysis.

**SUPPLEMENTARY TABLE 6. Cox proportional hazard regression analysis for independent predictors of late mortality in 30-day survivors.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristic | **Univariable analysis**  **HR (95% CI)** | ***p*** | **Multivariable analysis**  **HR (95% CI)** | ***p*** |
| Age | 1.063 (1.043 - 1.083) | <0.001 | 1.061 (1.041 - 1.081) | <0.001 |
| Male gender | 0.899 (0.612 - 1.320) | 0.588 |  |  |
| Hypertension | 0.962 (0.670 - 1.380) | 0.832 |  |  |
| History of aortic aneurysm | 1.190 (0.639 - 2.215) | 0.583 |  |  |
| Connective tissue disease | 0.228 (0.056 - 0.924) | 0.038 |  |  |
| Diabetes mellitus | 0.550 (0.077 - 3.939) | 0.552 |  |  |
| History of stroke | 1.181 (0.482 - 2.895) | 0.716 |  |  |
| Chronic kidney disease | 2.821 (1.240 - 6.417) | 0.013 | 2.997 (1.300 - 6.907) | 0.010 |
| COPD | 2.335 (1.311 - 4.156) | 0.004 | 1.837 (1.025 - 3.292) | 0.041 |
| DeBakey type 1 | 1.019 (0.670 - 1.550) | 0.931 |  |  |
| Intramural hematoma | 1.367 (0.752 - 2.484) | 0.305 |  |  |
| Hypotensive shock | 0.995 (0.621 - 1.596) | 0.985 |  |  |
| Cardiac arrest | 1.251 (0.510 - 3.065) | 0.625 |  |  |
| Malperfusion | 1.281 (0.873 - 1.879) | 0.206 |  |  |
| Proximal surgical technique  - Supracoronary graft  - Supracoronary graft + AVR  - Bentall procedure | ref.  1.651 (0.606 - 4.502)  0.829 (0.520 - 1.322) | 0.327  0.432 |  |  |
| Distal surgical technique  - Ascending aorta  - Hemiarch procedure  - Arch procedure | ref.  1.375 (0.899 - 2.103)  1.268 (0.553 - 2.907) | 0.142  0.575 |  |  |
| CPB-time, min | 0.999 (0.996 - 1.002) | 0.547 |  |  |
| Blood group O (vs Non-O) | 0.700 (0.477 - 1.028) | 0.069 | 0.686 (0.465 - 1.012) | 0.058 |
| Blood group   * O * A * B * AB | ref.  1.509 (1.008 - 2.258)  1.050 (0.550 - 2.005)  1.703 (0.761 - 3.809) | 0.046  0.883  0.195 | ref.  1.543 (1.027 - 2.319)  1.056 (0.549 - 2.029)  1.720 (0.765 - 3.866) | 0.037  0.871  0.190 |

Values are expressed as Hazard ratios (HR:s) and 95% Confidence intervals (CI)

COPD: chronic obstructive pulmonary disease; AVR: aortic valve replacement; CPB: cardiopulmonary bypass; Variables with p<0.100 included in multivariable analysis.