**Supplemental Digital Content**

**Table A.** Echocardiographic and hemodynamic parameters during surgery in patients who had acceptable LV strain images for analysis (N = 72). Certain echocardiographic and perioperative variables were not available in all patients; thus for these variables, N < 72. For example, only 44 of these 72 patients had acceptable images of RV strain.

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| --- | --- | --- | --- | --- | --- |
| **Intraoperative Variables** | **N** | **Beginning of surgery****(mean ± SD)** | **End of surgery** **(mean ± SD)** | **Change (97.6% CI)** | **P\*** |
| **Strain and strain rate outcomes** |  |  |  |  |  |
|  ***Primary analysis*** |  |  |  |  |  |
|  Left systolic strain (%) | 72 | -17.0 ± 3.6 | -16.3 ± 4.6 | 0.7 (-0.2, 1.5) | 0.071 |
|  Left systolic strain rate (sec-1) | 67 | -0.8 ± 0.2 | -1.1 ± 0.3 | -0.3(-0.4, -0.2) | <0.001 |
|  ***Secondary analysis*** |  |  |  |  |  |
|  Right systolic strain (%) |  44 | -21.6 ± 4.5 | -17.3 ± 4.3 | 4.3 (2.7, 5.8) | <0.001 |
|  Right systolic strain rate (sec-1) | 44 | -1.0 ± 0.3 | -1.1 ± 0.3 | -0.04 (-0.2, 0.1) | 0.50 |
| **Additional LV echocardiographic parameters**  |  |  |  | **Change (95% CI)** |  |
|  Ejection fraction (%) | 72 | 61 ± 12 | 67 ± 13 | 5 (3, 8) | <0.001 |
| Mitral lateral annular s' velocity (cm/sec) | 71 | 4.6 ± 1.5 | 6.5 ± 2.7 | 1.9 (1.4, 2.5) | <0.001 |
| Mitral lateral annular e' velocity (cm/sec) | 71 | 5.3 ± 1.7 | 5.4 ± 2.2 | 0.1 (-0.4, 0.5) | 0.75 |
| Mitral lateral annular a' velocity (cm/sec) | 71 | 4.9 ± 2.0 | 5.5 ± 2.5 | 0.5 (-0.1, 1.2) | 0.086 |
|  Early transmitral flow velocity (E-wave, m/sec) | 71 | 0.8 ± 0.2 | 0.8 ± 0.2 | 0.0 (-0.0, 0.1) | 0.068 |
|  Late transmitral flow velocity (A-wave, m/sec) | 68 | 0.6 ± 0.2 | 0.6 ± 0.2 | 0.1 (0.0, 0.1) | 0.021 |
|  E / A ratio | 68 | 1.4 ± 0.6 | 1.4 ± 0.6 | -0.1 (-0.2, 0.1) | 0.35 |
|  E / e' ratio | 70 | 17 ± 12 | 20 ± 27 | 3 (-1, 8) | 0.14 |
|  Deceleration time (msec) | 69 | 251 ± 70 | 235 ± 63 | -15 (-35, 5) | 0.13 |
| Velocity of propagation (cm/sec) | 72 | 46 ± 19 | 48 ± 18 | 2 (-4, 7) | 0.59 |
| LV diastolic strain rate (sec-1) | 72 | 1.0 ± 0.3 | 1.1 ± 0.3 | 0.1 (0.0, 0.2) | 0.003 |
| LV end-diastolic volume (%) | 35 | 87 (45) | 72 (40) | -15 (-23, -8) | <0.001 |
| LV end-systolic volume (%) | 35 | 39 (39) | 29 (35) | -10 (-13, -7) | <0.001 |
| LV end-systolic meridional wall stress (dynes/cm2) | 62 | 77 ± 55 | 48 ± 52 | -29 (-36, -22) | <0.001 |
| LV end-systolic dimension (cm) | 65 | 3.1 ± 1.1  | 2.9 ± 1.1 | -0.3 (-0.43, -0.12) | <0.001 |
| LV end-diasotlic dimension (cm)  | 66 | 4.0 ± 1.7 | 3.7 ± 1.4 | -0.3 (-0.77, 0.27) | 0.34 |
| **Additional RV echocardiographic parameters** |  |  |  |  |  |
| Tricuspid annular plane systolic excursion (cm) | 60 | 1.6 ± 0.4 | 1.0 ± 0.3 | -0.7 (-0.8, -0.5) | <0.001 |
| RV end-diastolic area (cm2) | 59 | 23.3 ± 6.1 | 21.6 ± 5.7 | -1.7 (-2.8, -0.7) | 0.001 |
| RV end-systolic area (cm2) | 59 | 13.5 ± 4.4 | 13.6 ± 4.5 | 0.1 (-0.6, 0.9) | 0.71 |
| RV fractional area change (%) | 59 | 0.4 ± 0.1 | 0.4 ± 0.1 | -0.1 (-0.1, -0.0) | <0.001 |
| RV early diastolic strain rate (sec-1)  | 56 | 1.2 ± 0.3 | 1.1 ± 0.4 | -0.1 (-0.2, 0.0) | 0.095 |
| **Aortic valve parameters** |  |  |  |  |  |
| Peak transvalvular gradient (mmHg) | 65 | 61 ± 19.7 | 17 ± 6.7 | -44 (-48.9, -39.4) | <0.001 |
| Mean transvalvular gradient (mmHg) | 65 | 36 ± 12.4 | 8 ± 3.1 | -29 (-31.6, -25.6) | <0.001 |
| **Hemodynamic parameters** |  |  |  |  |  |
| Heart rate (bpm) | 72 | 55 ± 8 | 69 ± 11 | 14 (11, 16) | <0.001 |
| Mean arterial pressure (mmHg) | 72 | 84 ± 11 | 75 ± 11 | -9 (-12, -5) | <0.001 |
| Central venous pressure (mmHg) | 70 | 15 ± 5 | 15 ± 6 | 0 (-1, 2) | 0.81 |
| Pulmonary artery systolic pressure (mmHg) | 49 | 39 ± 9 | 37 ± 11 | -2 (-4, 1) | 0.16 |
| Pulmonary artery diastolic pressure (mmHg) | 49 | 19 ± 6 | 20 ± 7 | 1 (-1, 3) | 0.24 |
|  Cardiac output (L/min) | 44 | 4.0 ± 0.8 | 5.0 ± 1.2 | 0.9 (0.6, 1.3) | <0.001 |
|  Cardiac index (L/min/m2) | 44 | 2.0 ± 0.4 | 2.5 ± 0.5 | 0.5 (0.3, 0.6) | <0.001 |
| Pharmacologic hemodynamic support at end of surgery |  |  |  |  |  |
|  Epinephrine only |  |  | 9 (13%) |  |  |
|  Norepinephrine only |  |  | 22 (31%) |  |  |
|  Epinephrine + norepinephrine |  |  | 2 (3%) |  |  |
|  Epinephrine, norepinephrine, +milrinone |  |  | 1 (1%) |  |  |
| LV = Left ventricle; RV = Right ventricle\*P values from paired t-test; the significance criterion of 0.024 for two primary analyses, and 0.024 for two secondary analyses after using the O’Brien-Fleming alpha-spending method to adjust for an interim analysis and Bonferroni correction. |