**Supplemental Digital Content 10A: Sensitivity Analysis: Multivariable Analysis of Preoperative Characteristics and Postoperative Acute Kidney Injury – Logistic Regression Full Model[†] Performed on Derivation Cohort: Cases with Missing Postoperative Creatinine Assumed Normal Renal Function**

| Risk Factor | β Coefficient | Multivariable model p-value | Adjusted Odds Ratio (95% Confidence Interval) [†] |
|---|---|---|---|
| **Medical Factors** | | | |
| **Patient Age (years)[§]** | 0.00002 | 0.02 | 1.00002 (1.00000-1.00004) |
| **BMI (kg/m²)[§§]** | 0.187 | <0.001 | 1.21 (1.16-1.25) |
| **Male Gender** | 0.368 | <0.001 | 1.44 (1.35-1.52) |
| **Patient Medical History** [*] | | | |
| Congestive Heart Failure | 0.037 | 0.42 | 1.04 (0.95-1.14) |
| Cardiac Arrhythmias | 0.085 | 0.03 | 1.09 (1.01-1.17) |
| Valvular Disease | -0.062 | 0.27 | 0.94 (0.84-1.05) |
| Pulmonary Circulation Disorders | 0.140 | 0.01 | 1.15 (1.03-1.29) |
| Peripheral Vascular Disorders | 0.077 | 0.05 | 1.08 (0.99-1.17) |
| Hypertension, Uncomplicated | 0.088 | 0.01 | 1.09 (1.02-1.17) |
| Hypertension, Complicated | 0.619 | <0.001 | 1.86 (1.69-2.04) |
| Paralysis/Other Neurological Disorders | 0.073 | 0.16 | 1.08 (0.97-1.19) |
| Chronic Pulmonary Disease | 0.041 | 0.28 | 1.04 (0.97-1.12) |
| Diabetes, Uncomplicated | 0.019 | 0.62 | 1.02 (0.95-1.10) |
| Diabetes, Complicated | 0.442 | <0.001 | 1.56 (1.34-1.80) |
| Hypothyroidism | -0.117 | 0.01 | 0.89 (0.81-0.97) |
| Liver Disease | 0.515 | <0.001 | 1.67 (1.52-1.83) |
| Peptic Ulcer Disease Excluding Bleeding | 0.074 | 0.44 | 1.08 (0.89-1.30) |
| AIDS/HIV | 0.260 | 0.39 | 1.30 (0.71-2.36) |
| Rheumatoid Arthritis / Collagen Vascular Diseases | -0.015 | 0.83 | 0.98 (0.85-1.14) |
| Coagulopathy | 0.358 | <0.001 | 1.43 (1.30-1.57) |
| Lymphoma | 0.048 | 0.64 | 1.05 (0.86-1.29) |
| Metastatic Cancer | 0.019 | 0.72 | 1.02 (0.92-1.13) |
| Solid Tumor | -0.105 | 0.02 | 0.90 (0.83-0.98) |
| Weight Loss | 0.182 | <0.001 | 1.20 (1.10-1.31) |
| Alcohol Abuse | -0.218 | 0.003 | 0.80 (0.70-0.93) |
| Drug Abuse | -0.045 | 0.62 | 0.96 (0.80-1.14) |
| Psychoses | 0.133 | 0.25 | 1.14 (0.91-1.44) |
| **Preoperative Chronic Medications** | | | |
| ACEI/ARB | 0.052 | 0.21 | 1.05 (0.97-1.14) |
| Beta Blocker | -0.014 | 0.72 | 0.99 (0.92-1.06) |
| **Preoperative hemoglobin (g/dL)** [§] | -0.007 | <0.001 | 0.99 (0.99-0.99) |
| **Preoperative eGFR (mL/min/1.73 m²)[**][§]** | -0.00004 | <0.001 | 0.99 (0.99-0.99) |
| **Preinduction Baseline Mean Arterial Pressure (mmHg)** [§] | -0.000001 | 0.82 | 1.00 (0.99-1.00) |
| **Surgical Factors** | | | |
| **Surgical Body Region** | | | |
| Elevated Risk (all regions except below) | 0.875 | <0.001 | 2.40 (2.17-2.65) |
| **Emergent Surgery** | 0.393 | <0.001 | 1.48 (1.35-1.63) |
| **Anesthetic Factors** | | | |
| **ASA Class** | | | |
| ASA Class 1 | 0 | (reference) | |
| ASA Class 2 | 0.242 | 0.06 | 1.27 (0.99-1.64) |
| ASA Class 3 | 0.971 | <0.001 | 2.64 (2.06-3.39) |
| ASA Class 4 | 1.398 | <0.001 | 4.05 (3.13-5.24) |
| ASA Class 5 | 1.862 | <0.001 | 6.44 (4.38-9.46) |
| **Expected Anesthesia Duration[§§§]** | 0.709 | <0.001 | 2.03 (1.92-2.15) |
| **General Anesthesia** | 0.327 | <0.001 | 1.39 (1.27-1.52) |
| **Institutional Factors** | | | |
| **Non-university Hospital (Fixed Effect)** | 0.014 | 0.93 | 1.01 (0.75-1.38) |
| **Institution (Random Effect), ICC (95% CI)** | | | 0.20 (0.11-0.34) |
| | | | |
| Original Model performance (c-statistic) | | | 0.75 (0.74-0.76) |
| New Model performance (c-statistic) | | | 0.78 (0.78-0.79) |

[†] Mixed effects model with anonymized institution ID as random effect; all other covariates fixed effects.

**Supplemental Digital Content 10B: Sensitivity Analysis: Risk of Acute Kidney Injury Associated with Intraoperative Hypotension by Preoperative Risk Quartile – Cases with Missing Postoperative Creatinine Assumed Normal Renal Function**

| Absolute Hypotension - Derivation Cohort | | | | |
|---|---|---|---|---|
| Intraoperative Hypotension[†] - Absolute MAP Values | Quartile 1[*] Low Preoperative Risk (N = 23,390) | Quartile 2[*] Medium Preoperative Risk (N = 23,390) | Quartile 3[*] High Preoperative Risk (N = 23,389) | Quartile 4[*] Highest Preoperative Risk (N = 23,390) |
| No Absolute Hypotension | (reference) n = 14,628 | (reference) n = 14,278 | (reference) n = 14,152 | (reference) n = 12,274 |
| MAP 60-64 mmHg | 1.10 (0.79-1.54) n = 4,657 | 1.27 (1.04-1.55) **Increased AKI** n = 4,729 | 1.18 (1.02-1.45) **Increased AKI** n = 4,700 | 1.19 (1.08-1.30) **Increased AKI** n = 5,133 |
| MAP 55-59 mmHg | 1.06 (0.70-1.60) n = 2,801 | 1.06 (0.82-1.37) n = 2,855 | 1.21 (1.02-1.45) **Increased AKI** n = 2,898 | 1.39 (1.26-1.54) **Increased AKI** n = 3,624 |
| MAP 50-54 mmHg | 1.33 (0.71-2.47) n = 886 | 1.08 (0.72-1.62) n = 1,015 | 1.39 (1.07-1.80) **Increased AKI** n = 1,011 | 1.72 (1.50-1.98) **Increased AKI** n = 1,393 |
| MAP <50 mmHg | 2.04 (0.99-4.20) n = 418 | 1.83 (1.18-2.85) **Increased AKI** n = 513 | 1.73 (1.29-2.33) **Increased AKI** n = 628 | 1.98 (1.69-2.32) **Increased AKI** n = 966 |

| Relative Hypotension - Derivation Cohort | | | | |
|---|---|---|---|---|
| Intraoperative Hypotension[†] – Relative MAP Values | Quartile 1[*] Low Preoperative Risk (N = 23,390) | Quartile 2[*] Medium Preoperative Risk (N = 23,390) | Quartile 3[*] High Preoperative Risk (N = 23,389) | Quartile 4[*] Highest Preoperative Risk (N = 23,390) |
| No Relative Hypotension | (reference) n = 13,379 | (reference) n = 11,167 | (reference) n = 9,633 | (reference) n = 9,104 |
| MAP 20-30% Below Baseline | 1.17 (0.84-1.64) n = 3,737 | 1.02 (0.82-1.27) n = 4,592 | 0.88 (0.75-1.03) n = 5,087 | 0.86 (0.79-0.95) **Decreased AKI** n = 5,378 |
| MAP 30-40% Below Baseline | 0.93 (0.65-1.35) n = 3,829 | 1.09 (0.88-1.37) n = 4,542 | 1.07 (0.92-1.25) n = 5,143 | 0.92 (0.84-1.02) n = 5,052 |
| MAP > 40% Below Baseline | 1.35 (0.93-1.98) n = 2,445 | 1.40 (1.11-1.77) **Increased AKI** n = 3,089 | 1.34 (1.13-1.58) **Increased AKI** n = 3,526 | 1.17 (1.05-1.29) **Increased AKI** n = 3,856 |
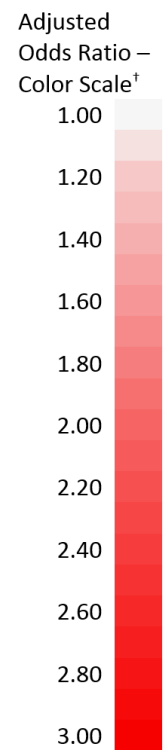
Adjusted Odds Ratio – Color Scale[†]

| Odds Ratio |
|---|
| 1.00 |
| 1.20 |
| 1.40 |
| 1.60 |
| 1.80 |
| 2.00 |
| 2.20 |
| 2.40 |
| 2.60 |
| 2.80 |
| 3.00 |

Values presented as adjusted odds ratio and 95% confidence interval.
[*] Patients were stratified by risk of postoperative AKI using the full multivariable model.
[†] Color scale used only for adjusted odds ratios demonstrating statistically significant associations.
Regression within each quartile included all four blood pressure ranges and operative duration (log transformed).
AKI = acute kidney injury; MAP = mean arterial pressure