Supplemental Digital Content 3: Missing Data Analysis – Univariate Analyses of Preoperative Patient Characteristics Among Patients Reviewed for Derivation Cohort Inclusion

Category	Characteristic	Cases with Complete Data[****] N=70,929 n(%)	Cases with Incomplete Data[*****] N=20,385 n(%)	p-Value
Anthropometric Data	Age ¥	58 [46-69]	58 [44-70]	0.052
	Body Mass Index ¥	28 [24-34]	28 [24-33]	0.131
	Gender (Male)	35,941 (51)	10,055 (49)	0.001
Patient Medical History[*]	Congestive Heart Failure	6,596 (9.3)	1,468 (8.8)	0.039
	Cardiac Arrhythmias	10,803 (15)	2,777 (17)	<0.001
	Valvular Disease	3,849 (5.4)	1,117 (6.7)	<0.001
	Pulmonary Circulation Disorders	3,363 (4.7)	851 (5.1)	0.056
	Peripheral Vascular Disorders	7,968 (11)	1,963 (12)	0.059
	Hypertension, Uncomplicated	27,847 (39)	4,991 (30)	<0.001
	Hypertension, Complicated	4,533 (6.4)	732 (4.4)	<0.001
	Paralysis/Other Neurological Disorders	5,519 (7.8)	1,724 (10)	<0.001
	Chronic Pulmonary Disease	11,981 (17)	2,463 (15)	<0.001
	Diabetes, Uncomplicated	11,440 (16)	2,420 (15)	<0.001
	Diabetes, Complicated	1,199 (1.7)	261 (1.6)	0.243
	Hypothyroidism	7,363 (10)	894 (5.4)	<0.001
	Liver Disease	4,998 (7.0)	1,516 (9.1)	<0.001
	Peptic Ulcer Disease Excluding Bleeding	1,111 (1.6)	227 (1.4)	0.049
	AIDS/HIV	132 (0.2)	42 (0.3)	0.088
	Lymphoma/Metastatic Cancer/Solid Tumor	14,428 (20)	2,913 (17)	<0.001
	Rheumatoid Arthritis / Collagen Vascular Diseases	2,568 (3.6)	440 (2.6)	<0.001
	Coagulopathy	4,231 (6.0)	1,124 (6.7)	<0.001
	Weight Loss	6,074 (8.6)	2,504 (15)	<0.001
	Alcohol Abuse	2,597 (3.7)	484 (2.9)	<0.001
	Drug Abuse	1,803 (2.5)	302 (1.8)	<0.001
	Psychoses	784 (1.1)	264 (1.6)	<0.001
Preoperative Medications	Angiotensin Converting Enzyme Inhibitor or Angiotensin Receptor Blocker	11,437 (16)	1,885 (9.2)	<0.001
	Beta Blocker	13,817 (20)	2,332 (11)	<0.001
Preoperative Laboratory Values	Preoperative Serum Hemoglobin Level ¥	12 [10-14]	12 [10-14]	<0.001
Preoperative eGFR[**] (mL/min/1.73 m²)	≥ 90	34,447 (49)	9,642 (47)	
	60-89	24,378 (34)	6,935 (34)	<0.001
	45-59	6,327 (8.9)	1,827 (9.0)	
	30-44	3,742 (5.3)	1,183 (5.8)	
	15-29	2,035 (2.9)	798 (3.9)	
Preinduction Blood Pressure	Mean Arterial Pressure (mmHg)¥	91 [81-101]	88 [76-101]	<0.001
Surgical Characteristics	Emergent Procedure	5,918 (8.3)	5,576 (31)	<0.001

Surgical Procedure Type / Body Region (Anesthesia CPT Code)	Head (0100-00222)	7,097 (10)	2,151 (11)	
	Neck (00300-00352)	4,496 (6.4)	1,060 (5.2)	
	Thorax - chest wall & shoulder girdle (00400-00474)	2,709 (3.8)	898 (4.4)	
	Thorax - intrathoracic (00500-00580)	7,595 (11)	1,341 (6.6)	
	Spine and spinal cord (00600-00670)	5,773 (8.2)	1,891 (9.3)	
	Upper abdomen (00700-00797)	15,199 (22)	3,748 (18)	
	Lower abdomen (00800-00882)	6,394 (9.1)	3,000 (15)	
	Perineum (00902-00952)	790 (1.1)	239 (1.2)	
	Pelvis, except hip (01112-01190)	545 (0.8)	163 (0.8)	<0.001
	Upper leg, except knee (01200-01274)	5,803 (8.2)	1,836 (9.0)	
	Knee and popliteal area (01320-01444)	3,435 (4.9)	1,269 (6.2)	
	Lower leg, ankle, and foot (01462-01522)	2,317 (3.3)	759 (3.7)	
	Shoulder and axilla (01610-01682)	795 (1.1)	262 (1.3)	
	Upper arm and elbow (01710-01782)	457 (0.6)	185 (0.9)	
	Forearm, wrist, and hand (01810-01860)	699 (1.0)	374 (1.8)	
	Radiological procedure (01916-01936) [***]	5,318 (7.5)	822 (4.0)	
	Burn excisions or debridement (01951-01953)	578 (0.8)	59 (0.3)	
	Obstetric (01958-01969)	597 (0.8)	295 (1.4)	
Anesthetic Characteristics	General Anesthetic Used	60,633 (86)	18,377 (90)	<0.001
	Anesthetic Duration, min ¥	200 [140-292]	172 [121-249]	<0.001
ASA Physical Classification	ASA 1	2,168 (3.1)	711 (5.2)	
	ASA 2	22,067 (31)	4,642 (34)	
	ASA 3	38,307 (54)	6,511 (48)	<0.001
	ASA 4	8,177 (12)	1,763 (13)	
	ASA 5	210 (0.3)	88 (0.6)	
Institution Characteristics	Non-University Hospital	5,190 (7.3)	4,616 (23)	<0.001
	Institution A	42,879 (61)	1,819 (8.9)	<0.001
	Institution B	6,879 (9.7)	9,409 (46)	
	Institution C	2,770 (3.9)	372 (1.8)	
	Institution D	12,971 (18)	3,841 (19)	
	Institution E	240 (0.3)	328 (1.6)	
	Institution F	3,571 (5.0)	820 (4.0)	
	Institution G	88 (0.1)	3,540 (17)	
	Institution H	1,531 (2.2)	256 (1.3)	

[*]As determined by Elixhauser Comorbidity Enhanced ICD-9-CM/ICD-10 CM Algorithm; excluding renal failure, obesity, and fluid/electrolyte disorders.

[**] As determined by CKD-EPI formula, indexed by body surface area; stratified by Kidney Disease Improving Global Outcomes chronic kidney disease guidelines. Race assumed non-black for patients with race data unavailable.

[***] Including procedures with and without intravenous contrast

[****] Included in the multivariable analysis of preoperative characteristics and postoperative acute kidney injury, derivation cohort.

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¥ = non-parametric data presented as median [25th to 75th percentile]

AIDS = autoimmune deficiency syndrome; ASA = American Society of Anesthesiologists; CKD-EPI = Chronic Kidney Disease Epidemiology Collaboration; CPT = Common Procedural Terminology; eGFR = estimated glomerular filtration rate; HIV = human immunodeficiency virus