

SUPPLEMENTAL MATERIAL

Table S1. International Classification of Disease Codes

ICD-10-CM or ICD-10-PCS	
Inclusion or Stratification Criteria	
Acute myocardial infarction	I21.0x, I21.1x, I21.2x, I21.3x, and I21.4x
Cardiogenic shock	R57.0
ECMO	5A15223, 5A1522F, 5A1522G, 5A1522H
Intra-aortic balloon pump	5A02110, 5A02210
Impella	5A0221D, 5A0211D
Placement of durable left ventricle assist device	02HA0QZ, 02HA3QZ, 02HA4QZ
Heart transplant	02YA0Z0, 02YA0Z1, 02YA0Z2, 0BYM0Z0, 0BYM0Z1, 0BYM0Z2, 02YA0Z0, 02YA0Z1, 02YA0Z2, 02RK0JZ, 02RL0JZ, 02RK0JZ, 02RL0JZ, 02WA0JZ, 02WA0JZ, 02PA0JZ
Baseline Characteristics	
Atrial Fibrillation/Flutter	I48*
Heart Failure	I50*
Hypertension	I10*, I11, I12, I13, I16
Coronary Artery Disease / Prior Acute Myocardial Infarction	I21.01, I21.02, I21.09, I21.11, I21.19, I21.21, I21.29, I21.3, I21.4, I21.9 I22.0, I22.1, I22.2, I22.8, I22.9 I25.1, I25.2, I25.7, I25.8 Z95.1, Z95.5, Z98.61
Chronic Kidney Disease	N18*

Chronic Obstructive Pulmonary Disease	J40*-J45*, J47*
Diabetes Mellitus	E10*, E11*, E13*, E14*
Peripheral Artery Disease	I70.1, I70.2, I70.3, I70.4, I70.5, I70.6, I70.7, I70.8, I70.9, I73.9, Z95.82
Primary Pulmonary Hypertension	I27.0
TIA/Ischemic Stroke	G45, I60.0 - I60.9, I63, I67.81, I67.82, I67.89, I67.9, I97.81, I97.82
Valvular Heart Disease	I34, I35, I36, I37, I05, I06, I07, I08, I09.1, Z95.2, Z95.3, Z95.4
Sleep Apnea	G47.30 – G47.39
Depression	F33*
Anemia	D50, D51, D52, D53, D59, D63.0, D63.1, D63.8, D64.9
Thyroid Disease	E03, E05, E06, E07.9
Obesity	E66*

Abbreviations: ICD, International Classification of Diseases

Table S2. Clinical outcomes By Impella and Intraortic Balloon Pump with VA-ECLS

Outcome	Impella*		Intraortic Balloon Pump*	
	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]
In-hospital mortality				
Overall	1.25 (0.98, 1.58)	1.24 (0.98, 1.57)	0.93 (0.77, 1.12)	0.84 (0.69, 1.03)
AMI	1.30 (0.92, 1.84)	1.36 (0.95, 1.94)	0.80 (0.60, 1.07)	0.76 (0.56, 1.03)
Non-AMI	1.00 (0.71, 1.41)	1.01 (0.72, 1.43)	1.03 (0.81, 1.31)	0.87 (0.67, 1.12)
Discharge to Skilled nursing facility	0.65 (0.46, 0.92)	0.62 (0.43, 0.89)	0.67 (0.52, 0.86)	0.59 (0.45, 0.77)
	Change in estimate (95% CI)	p-value	Change in estimate (95% CI)	p-value
Length of stay (days)	-2.5 (-5.2, 0.1)	0.06	0.2 (-2.2, 2.6)	0.84
<p>* Compared to VA-ECLS only [†] Adjusted for age, CCI, atrial fibrillation, hypertension, diabetes mellitus, chronic obstructive pulmonary disease, primary insurance, year, income quartile of patient's ZIP code, and hospital bed size Abbreviations: VA-ECLS, veno-arterial extra-corporeal life support; AMI, acute myocardial infarction</p>				

Table S3. Outcomes in adults with cardiogenic shock and VA-ECLS by timing of second MCS device

Outcome	Second MCS device >24 hours Prior to VA-ECLS*		Second MCS device >24 hours After VA-ECLS*	
	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]
In-hospital mortality	1.15 (0.84, 1.59)	1.13 (0.81, 1.59)	1.05 (0.69, 1.60)	1.04 (0.66, 1.64)
Discharge to Skilled nursing facility	1.14 (0.74, 1.75)	0.89 (0.52, 1.52)	1.72 (0.92, 3.20)	1.52 (0.79, 2.92)
	Change in estimate (95% CI)	p-value	Change in estimate (95% CI)	p-value
Length of stay (days)	8.7 (3.8, 13.5)	<0.001	6.7 (2.3, 11.2)	0.003

* Compared to VA-ECLS + Second MCS on same hospital day
[†] Adjusted for age, CCI, atrial fibrillation, hypertension, diabetes mellitus, chronic obstructive pulmonary disease, primary insurance, year, income quartile of patient's ZIP code, and hospital bed size
Abbreviations: VA-ECLS, veno-arterial extra-corporeal life support; MCS, mechanical circulatory support

Table S4. Sensitivity analysis including only those undergoing second MCS within two hospital days of VA-ECLS

Outcome	Impella*		Intraortic Balloon Pump*	
	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]
In-hospital mortality				
Overall	1.29 (0.98, 1.69)	1.27 (0.96, 1.68)	0.85 (0.68, 1.08)	0.75 (0.59, 0.97)
AMI	1.19 (0.81, 1.76)	1.21 (0.81, 1.82)	0.75 (0.53, 1.06)	0.71 (0.48, 1.03)
Non-AMI	0.83 (0.55, 1.28)	1.21 (0.78, 1.88)	1.14 (0.84, 1.53)	0.75 (0.55, 1.02)
Discharge to skilled nursing facility	0.55 (0.36, 0.85)	0.54 (0.34, 0.84)	0.80 (0.59, 1.08)	0.73 (0.54, 1.00)
	Change in estimate (95% CI)	p-value	Change in estimate (95% CI)	p-value
Length of stay (days)	-6.9 (-9.7, -4.1)	<0.001	-0.7 (-3.2, 1.8)	0.58

*Compared to VA-ECLS only
[†]Adjusted for age, CCI, atrial fibrillation, hypertension, diabetes mellitus, chronic obstructive pulmonary disease, primary insurance, year, income quartile of patient's ZIP code, and hospital bed size
Abbreviations: VA-ECLS, veno-arterial extra-corporeal life support; AMI, acute myocardial infarction

Table S5. Sensitivity analysis of those with cardiogenic shock and VA-ECLS complicating acute myocardial infarction

Outcome	Impella*		Intraortic Balloon Pump*	
	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio [†]
In-hospital mortality	1.39 (0.96, 2.02)	1.52 (1.04, 2.21)	0.85 (0.62, 1.17)	0.80 (0.57, 1.12)
Discharge to Skilled Nursing Facility	0.61 (0.35, 1.07)	0.62 (0.32, 1.20)	0.65 (0.40, 1.04)	0.54 (0.31, 0.94)
	Change in estimate	p-value	Change in estimate	p-value
Length of stay (days)	-6.9 (-9.7, -4.1)	<0.001	-2.1 (-5.7, 1.6)	0.26
<p>* Compared to VA-ECLS only [†] Adjusted for age, CCI, atrial fibrillation, hypertension, diabetes mellitus, chronic obstructive pulmonary disease, primary insurance, year, income quartile of patient's ZIP code, and hospital bed size Abbreviations: VA-ECLS, veno-arterial extra-corporeal life support</p>				