

The Effect of Obesity on Outcomes of Mechanical Circulatory Support for Acute Myocardial Infarction Complicated by Cardiogenic Shock: Insight from the National Inpatient Sample Database

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Introduction

- **Cardiogenic shock** is estimated to occur in approximately 10% of patients with **acute myocardial infarction** and is associated with an early mortality rate of 40% to 50%.
- There is a **2a** recommendation for the use of **Impella** in patients with **acute myocardial infarction complicated with shock (AMICS)**.
- Studies comparing the outcome of **AMICS** in obese vs. normal weight patients treated with **Impella** are lacking.

Methods

- We utilized the National Inpatient Sample (NIS) 2016-2020 to identify patients admitted with **AMICS**
- Using the ICD code, we identified patients treated with Impella and stratified them into two groups based on their BMI: **obesity (BMI 30-39.9)** and **normal weight (BMI 20-24.9)**
- The primary outcome was in-hospital mortality
- Secondary outcomes included cardiac arrest, stroke, acute kidney injury, bleeding, acute respiratory failure, palliative consults, hospital length of stay, and total hospital charges
- **Multivariate logistic regression** was used to adjust for outcomes
- A **p-value of 0.05** was considered significant.

Conclusion

- There were no significant differences in in-hospital mortality or secondary outcomes between obese and normal-weight AMICS patients treated with Impella. PCI with Impella may be performed safely in AMICS patients with and without obesity.

Variables	AMICS + MCS (%)		P- values
	Normal Weight	Obese	
PATIENT CHARACTERISTICS			
Age, years, mean ± SE	69.80 ± 14.80	63.50 ± 10.89	
SEX			0.187
Male	78.05	71.3	
Female	21.95	28.7	
RACE			0.0055
White	65	78.13	
Black	12.5	7.76	
Hispanic	7.5	7.76	
Asian	6.25	2.37	
CARDIOVASCULAR COMORBIDITIES			
Dyslipidemia	62.2	69.98	0.3792
History of MI	14.63	15.43	0.8465
History of PCI	0	0.82	0.4123
History of CABG	3.66	5.04	0.5800
History of Pacemaker Placement	1.22	1.34	0.9286
Coronary artery disease	2.44	3.19	0.7049
Hypertension	10.98	25.62	0.0030
Peripheral vascular disease	6.1	3.7	0.2857
Diabetes	10.98	15.33	0.2910
Smoking	35.37	25.51	0.0510
NON-CARDIOVASCULAR COMORBIDITIES			
Liver disease	19.51	18.31	0.7828
Electrolyte abnormalities	62.2	56.07	0.2887
Maintenance Hemodialysis	0	4.32	0.5672
Oxygen dependence	1.22	2.16	0.5672
Anemia	59.76	38.68	0.0003
COPD	20.73	15.23	0.1754
Hyperthyroidism	1.22	0.41	0.3066
Depression	8.54	6.48	0.4750
OSA	24.4	16.05	0.009
HOSPITAL CHARACTERISTICS			
Hospital Bed-size			0.9335
Small	13.41	13.48	
Medium	26.83	28.7	
Large	59.76	57.82	
Hospital Region			0.4005
Northeast	18.29	11.93	
Midwest	29.27	31.38	
South	36.59	37.35	
West	15.85	19.34	
Hospital Teaching Status			0.4561
Rural	4.88	4.01	
Urban non-teaching	13.41	19.03	
Urban teaching	81.71	76.95	
Hospital Location			0.8682
Rural	4.62	4.19	
Urban	95.38	95.81	
CHARLSON COMORBIDITY INDEX SCORE			
1	8.54	7.82	
2	18.29	24.28	
≥3	73.17	67.9	

Table 1A shows patient characteristics and baseline comorbidities.

Variable	Normal Weight (%)	Obese (%)	Regression analysis, OR (95% CI) P-value	
			Univariate regression	Multivariate regression
Mortality	31.7	27.8	1.2 (0.74-1.98) 0.454	0.84 (0.41-1.71) 0.623
Cardiac arrest	7.3	10.8	0.65 (0.28-1.54) 0.329	0.52 (0.15-1.76) 0.29
Respiratory failure	60.98	54.63	1.30 (0.83-2.04) 0.258	1.05 (0.53-2.05) 0.90
Mechanical ventilation	3.66	2.67	1.38 (0.41-4.70) 0.61	0.99 (0.11-9.16) 0.991
Stroke	2.43	1.44	1.71 (0.39-7.54) 0.478	1.39 (0.05-38.79) 0.85
Acute kidney injury	64.6	51.2	1.74 (1.09-2.78) 0.020	1.32 (0.66-2.65) 0.426
Major bleeding	3.65	3.80	0.96 (0.29-3.20) 0.947	0.96 (0.29-3.15) 0.946
Palliative Consult	19.5	11	1.96 (1.07-3.60) 0.030	1.46 (0.63-3.36) 0.377
Length of stay	12.99 ± 11.10	8.50 ± 8.13	4.49 (2.02-6.95) 0.000	4.43 (1.40-7.28) 0.004
Total hospital charge	325,926.3 ± 264,145.2	294,629.1 ± 253,272.1		

Table 1B shows primary and secondary outcomes.