

Culprit-Only Versus Multi-Vessel Revascularization for Cardiogenic Shock

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Background/Aims: Despite the benefit of culprit-only percutaneous coronary intervention (PCI) in the CULPRIT-SHOCK trial, the optimal revascularization strategy for non-culprit lesion (NCL) remains controversial, especially in patients with a severe form of shock (SCAI classification “E”) or those with large NCL ischemic territory. This study aimed to identify whether the effects of multi-vessel PCI differed according to shock severity and NCL characteristics for acute myocardial infarction and cardiogenic shock (AMICS).

Methods: From the RESCUE registry, which included 12 tertiary centers, a total of 695 patients with AMICS were included in this analysis. Patients with multi-vessel disease were classified into culprit-only versus immediate multi-vessel PCI according to NCL treatment strategies. The co-primary endpoints were 30-day mortality or renal-replacement therapy (RRT) and 6-month follow-up mortality.

Results: Among the study population, 536 patients had multi-vessel disease; 369 (68.8%) underwent culprit-only PCI and 169 (31.2%) underwent immediate multi-vessel PCI. There were no significant differences in the risks of 30-day mortality or RRT (40.4% vs. 34.7%, $p=0.251$), and 6-month follow-up all-cause mortality (34.1% vs. 38.3%, HR:0.87, 95% CI:0.64-1.19, $p=0.387$) between the culprit-only and immediate multi-vessel PCI. However, immediate multi-vessel PCI was associated with significantly lower risks of 30-day mortality or RRT and 6-month follow-up all-cause mortality in patients with SCAI shock “E” classification (30-day mortality or RRT: 62.2% vs. 46.9%, $p=0.013$; and 6-month follow-up all-cause mortality: 59.5% vs. 45.0%, HR:0.63, 95% CI:0.45-0.88, $p=0.007$) or large NCL ischemic territory [left main or proximal left anterior descending artery involvement] (30-day mortality or RRT: 53.4% vs. 32.0%, $p=0.041$; and 6-month follow-up all-cause mortality: 51.6% vs. 30.8%, HR:0.53, 95% CI:0.29-0.97, $p=0.040$) compared with culprit-only PCI.

Conclusions: Among AMICS patients with multi-vessel disease, immediate multi-vessel PCI might be associated with improved clinical outcomes in patients with an extremely advanced form of CS or a large NCL ischemic burden.

Figure 4. Beneficial Effects of Multi-vessel PCI for Patients with Acute Myocardial Infarction and Multi-vessel Disease Complicated by CS According to Shock Severity or Lesion Complexity.

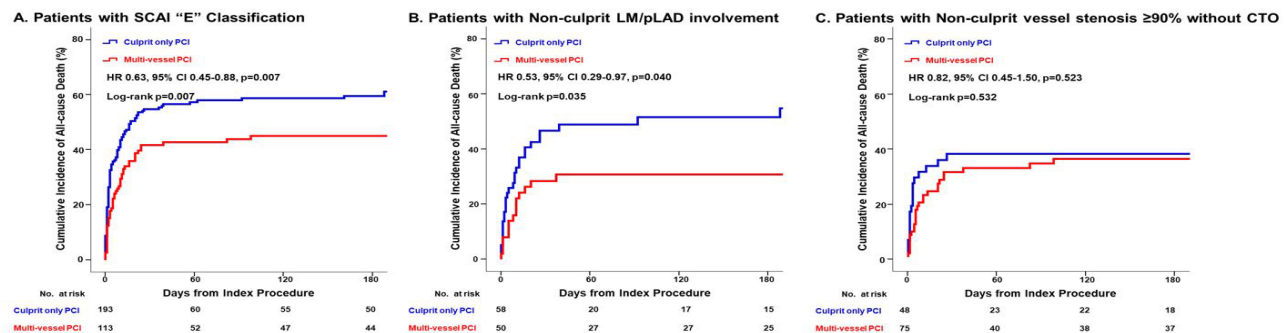


Table 4. Differential Treatment Effects of Multi-Vessel PCI According to Shock Severity or Lesion Complexity.

	Culprit-only PCI ^a	Multi-vessel PCI ^a	Univariate Analysis ^a			Multivariable Analysis ^{a,c}			Interaction p value ^a
	n=193 ^a	n=113 ^a	HR ^a	95% CI ^a	P value ^a	HR ^a	95% CI ^a	P value ^a	
Patients with SCAI “E” Classification^a									
All-cause mortality ^a	112 (59.5%) ^a	49 (45.0%) ^a	0.63 ^a	0.45-0.88 ^a	0.007 ^a	0.67 ^a	0.47-0.96 ^a	0.026 ^a	$p=0.44$ for All-cause mortality ^a
POCE ^a	121 (64.8%) ^a	55 (50.9%) ^a	0.67 ^a	0.49-0.92 ^a	0.012 ^a	0.72 ^a	0.52-0.99 ^a	0.049 ^a	
Patients with SCAI “C or D” Classification^a									
All-cause mortality ^a	22 (14.5%) ^a	6 (11.6%) ^a	0.85 ^a	0.37-1.97 ^a	0.703 ^a	0.87 ^a	0.34-2.24 ^a	0.779 ^a	$p=0.13$ for POCE ^a
POCE ^a	32 (21.4%) ^a	11 (23.7%) ^a	1.07 ^a	0.58-1.97 ^a	0.825 ^a	1.01 ^a	0.50-2.05 ^a	0.977 ^a	
Patients with Non-culprit LM or proximal LAD involvement^a									
All-cause mortality ^a	28 (51.6%) ^a	15 (30.8%) ^a	0.53 ^a	0.29-0.97 ^a	0.040 ^a	0.58 ^a	0.19-0.79 ^a	0.009 ^a	$p=0.11$ for All-cause mortality ^a
POCE ^a	30 (56.1%) ^a	18 (37.7%) ^a	0.51 ^a	0.30-0.90 ^a	0.019 ^a	0.44 ^a	0.23-0.82 ^a	0.011 ^a	
Patients without Non-culprit LM or proximal LAD involvement^a									
All-cause mortality ^a	106 (35.9%) ^a	40 (35.6%) ^a	0.95 ^a	0.66-1.37 ^a	0.783 ^a	0.76 ^a	0.52-1.12 ^a	0.168 ^a	$p=0.04$ for POCE ^a
POCE ^a	123 (42.2%) ^a	48 (44.0%) ^a	1.04 ^a	0.76-1.44 ^a	0.807 ^a	0.85 ^a	0.60-1.19 ^a	0.340 ^a	
Patients with Non-culprit vessel stenosis $\geq 90\%$ without CTO^a									
All-cause mortality ^a	18 (37.8%) ^a	26 (35.9%) ^a	0.82 ^a	0.45-1.50 ^a	0.523 ^a	0.58 ^a	0.27-1.27 ^a	0.174 ^a	$p=0.91$ for All-cause mortality ^a
POCE ^a	21 (44.7%) ^a	33 (47.2%) ^a	0.90 ^a	0.52-1.56 ^a	0.716 ^a	0.63 ^a	0.33-1.20 ^a	0.159 ^a	
Patients with Non-culprit vessel stenosis $<90\%$ or CTO^a									
All-cause mortality ^a	116 (38.3%) ^a	29 (32.5%) ^a	0.86 ^a	0.57-1.29 ^a	0.457 ^a	0.82 ^a	0.52-1.29 ^a	0.398 ^a	$p=0.85$ for POCE ^a
POCE ^a	132 (44.3%) ^a	33 (37.7%) ^a	0.85 ^a	0.58-1.24 ^a	0.385 ^a	0.80 ^a	0.54-1.19 ^a	0.276 ^a	

The cumulative incidence of clinical outcomes is presented as event number and Kaplan-Meier estimates at 6 months from the index procedure.^a

^aAdjusted variables included age, sex, history of chronic kidney disease, history of stroke, severe left ventricular systolic dysfunction (ejection fraction $<30\%$), ST-segment elevation myocardial infarction, IABP-SHOCK 2 score, left main or left anterior descending artery as a culprit vessel, culprit lesion TIMI flow grade after PCI, mechanical ventilation, and pre-PCI ECMO insertion.^a

^aPOCE was defined as a composite of all-cause death, myocardial infarction, re-hospitalization due to heart failure, and repeat revascularization.^a

CI= confidence interval; CTO= chronic total occlusion; HR= hazard ratio; PCI= percutaneous coronary intervention; POCE= patient-oriented composite endpoint; SCAI= Society for Cardiovascular Angiography and Intervention.^a