©Copyright by Croatian Cardiac Society. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/) which permits users to read, download, copy, distribute, print, search, or link to the full texts of these articles in any medium or format and to remix, transform and build upon the material, provided the original work is properly cited and any changes properly indicated.

Impella CP® in elective high-risk percutaneous coronary intervention and infarct-related cardiogenic shock: one device, two populations

Ana Reschner Planinc[1]*,
Marijan Pašalić[2],
Eduard Margetić[2],
Kristina Marić Bešić[2],
Davor Radić[2],
Boško Skorić[2],
Hrvoje Jurin[2],
Denis Došen[2],
Tomislav Krčmar[2],
Luka Perčin[2],
Davor Miličić[2],
Daniel Lovrić[2],
Joško Bulum[2],
Zvonimir Ostojić[2]

[1]Special Hospital for Pulmonary Diseases, Zagreb, Croatia
[2]University Hospital Centre Zagreb, University of Zagreb School of Medicine, Zagreb, Croatia

KEYWORDS: Impella, high-risk percutaneous coronary intervention, cardiogenic shock, acute myocardial infarction.

CITATION: Cardiol Croat. 2026;21(11-12):295-6. | https://doi.org/10.15836/ccar2026.295

***ADDRESS FOR CORRESPONDENCE:** Ana Reschner Planinc, Specijalna bolnica za plućne bolesti, Rockefellerova 3, HR-10000 Zagreb, Croatia. / Phone: +385-99-7368-949 / E-mail: anchice.reschner@gmail.com

ORCID: Ana Reschner Planinc, https://orcid.org/0000-0002-6723-6822 • Marijan Pašalić, https://orcid.org/0000-0002-3197-2190
Eduard Margetić, https://orcid.org/0000-0001-9224-363X • Kristina Marić Bešić, https://orcid.org/0000-0002-4004-7271
Davor Radić, https://orcid.org/0000-0002-9132-1568 • Boško Skorić, https://orcid.org/0000-0001-5979-2346
Hrvoje Jurin, https://orcid.org/0000-0002-2599-553X • Denis Došen, https://orcid.org/0000-0003-3490-5505
Tomislav Krčmar, https://orcid.org/0000-0003-4689-1673 • Luka Perčin, https://orcid.org/0000-0003-0497-6871
Davor Miličić, https://orcid.org/0000-0001-9101-1570 • Daniel Lovrić, https://orcid.org/0000-0002-5052-6559
Joško Bulum, https://orcid.org/0000-0002-1482-6503 • Zvonimir Ostojić, https://orcid.org/0000-0003-1762-9270

Introduction: Microaxial flow pumps are used in two different percutaneous coronary intervention (PCI) settings: elective high-risk PCI and acute myocardial infarction-related cardiogenic shock (AMI-CS). In selected STEMI-related shock, Impella CP® reduced 180-day mortality (DanGer Shock)[1], whereas routine use during elective high-risk PCI did not improve outcomes (CHIP-BCIS3). We describe patient profile, procedural complexity and outcomes of Impella CP®-supported PCI in both settings in our centre.

Patients and Methods: We retrospectively analyzed our University Hospital Centre Zagreb Impella CP®registry (September 2021-June 2026). For this analysis, patients were grouped: elective high-risk PCI with preserved left ventricular ejection fraction (LVEF), elective high-risk PCI with reduced LVEF, and AMI-CS treated with PCI. Continuous variables are reported as median (IQR) and categorical variables as n (%). Outcomes measured were survival to discharge (alive at discharge or transfer), 30-day and 90-day survival, and all-cause mortality (ACM) during follow-up.

Results: Elective PCI was performed in 9 patients with preserved LVEF and 31 with reduced LVEF, while 29 patients were treated with PCI in AMI-CS setting; values are given in this order. Detailed demographic and procedural data are presented in **Table 1**. Impella was placed upfront in all patients undergoing elective PCI, whereas in AMI-CS it was inserted prior to PCI in 11, during PCI in 3 and after PCI in 15 patients. ECPELLA (veno-arterial extra-corporeal membrane oxygenation with Impella) was required only in AMI-CS patients (44.8%;). Survival to discharge was observed in 7/9 (77.8%), 30/31 (96.8%) and 14/29 (48.3%), 30-day survival in 7/9 (77.8%), 28/31 (90.3%) and 16/29 (55.2%), and 90-day survival in 7/9 (77.8%), 27/31 (87.1%) and 14/29 (48.3%) patients, respectively. Death (ACM) occurred in 2/9 (22.2%), 10/31 (32.3%) and 15/29 (51.7%) patients during the median follow-up of 22.6 (1.7–30.3)/17.3 (3.6–30.9)/1.3 (0.5–7.9) months, respectively.

TABLE 1. Demographic and procedural data.

	Complex PCI in preserved LVEF (N=9)	Complex PCI in reduced LVEF (N=31)	AMI-CS with performed PCI (N=29)	p-value
Female sex	1 (11.1%)	8 (25.8%)	10 (34.5%)	0.43
Age, years	69 (64-78)	70 (65-74)	62 (57-75)	0.19
LVEF, %	60 (58-62)	30 (25-35)	35 (25-45)	<0.001
Prior PCI	4 (44.4%)	14 (45.2%)	10 (34.5%)	0.70
Multivessel disease	9 (100.0%)	29 (93.5%)	27 (93.1%)	1.00
LMCA disease	6 (66.7%)	18 (58.1%)	10 (35.7%)	0.12
LAD disease	9 (100.0%)	29 (93.5%)	25 (86.2%)	0.49

RECEIVED:
October 25, 2026
UPDATED:
November 4, 2026

TABLE 1. Demographic and procedural data.

LCx disease	7 (77.8%)	22 (71.0%)	21 (72.4%)	1.00
RCA disease	5 (55.6%)	27 (87.1%)	22 (75.9%)	0.13
LMCA treated	7 (77.8%)	20 (64.5%)	15 (51.7%)	0.34
LAD treated	9 (100.0%)	24 (77.4%)	21 (72.4%)	0.24
LCx treated	5 (55.6%)	10 (32.3%)	15 (51.7%)	0.22
RCA treated	0 (0.0%)	8 (25.8%)	4 (13.8%)	0.20
Rotational atherectomy	5 (55.6%)	7 (22.6%)	4 (14.3%)	0.046
Number of stents	2 (2-3)	2 (1-3)	2 (1-3)	0.43
Impella vascular access				0.011
Left femoral	8 (88.9%)	24 (80.0%)	14 (48.3%)	
Right femoral	1 (11.1%)	5 (16.7%)	15 (51.7%)	
Axillary	0 (0.0%)	1 (3.3%)	0 (0.0%)	
Vascular closure device	9 (100.0%)	31 (100.0%)	19 (90.5%)	0.24
Kerma, mGy	5207 (3684-7027)	4115 (2095-7489)	3427 (1994-4760)	0.23
Contrast, ml	470 (280-550)	320 (270-430)	300 (235-440)	0.29
Fluoroscopy time, min	195.5 (168.0-216.0)	144.5 (118.0-193.0)	125.0 (75.0-180.0)	0.18
ECPELLA	0 (0.0%)	0 (0.0%)	13 (44.8%)	<0.001
Survived to discharge	7/9 (77.8%)	30/31 (96.8%)	14/29 (48.3%)	<0.001
30-day survival	7/9 (77.8%)	28/31 (90.3%)	16/29 (55.2%)	0.006
90-day survival	7/9 (77.8%)	27/31 (87.1%)	14/29 (48.3%)	0.003
Follow-up, months	22.6 (1.7-30.3)	17.3 (3.6-30.9)	1.3 (0.5-7.9)	0.004
All-cause death during follow-up	2/9 (22.2%)	10/31 (32.3%)	15/29 (51.7%)	0.18

Data are presented as median (IQR) for continuous measures, and No. (%) for categorical measures. *Total follow-up 6.7 (0.8 – 27.9) months.

LVEF- left ventricular ejection fraction, PCI- percutaneous coronary intervention, LMCA- left main coronary artery, LAD- left anterior descending artery, LCX- left circumflex artery, RCA- right coronary artery, ECPELLA- veno-arterial extra corporeal membrane oxygenation with Impella, AMI-CS- acute myocardial infarction-related cardiogenic shock

Conclusion: Impella CP® supported extensive, complex revascularization both in elective high-risk PCI and in patients with CS-AMI. Based on procedural details, the most complex interventions, probably reflecting the most complex coronary pathology, were performed in patients with preserved LVEF. However, none of them died after discharge, and their all-cause mortality during follow-up was numerically lower than with reduced LVEF. AMI-CS patients had comparably extensive coronary disease, often required ECPELLA, and fewer than half survived to discharge.

LITERATURE

1. Møller JE, Beske RP, Engstrøm T, Jensen LO, Eiskjær H, Mangner N, et al. Long-Term Outcomes of the DanGer Shock Trial. N Engl J Med. 2025 Sep 11;393(10):1037-1038. https://doi.org/10.1056/nejmc2508284