

Henry Ford Health

Henry Ford Health Scholarly Commons

Cardiology Meeting Abstracts

Cardiology/Cardiovascular Research

9-1-2022

TCT-70 Clinical Predictors of Patients Requiring Prolonged Mechanical Circulatory Support After High-Risk PCI

Mir B. Basir

Alejandro Lemor

Yanru Li

Bjorn Redfors

Alexander Truesdell

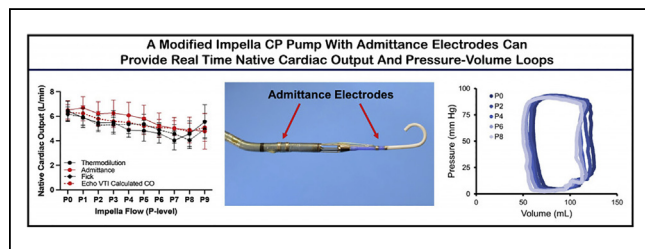
See next page for additional authors

Follow this and additional works at: https://scholarlycommons.henryford.com/cardiology_mtgabstracts

Authors

Mir B. Basir, Alejandro Lemor, Yanru Li, Bjorn Redfors, Alexander Truesdell, Aditya Bharadwaj, Amir Kaki, David Wohns, Perwaiz Meraj, Ramesh Daggubati, Cindy Grines, William O'Neill, and Jeffrey Moses

compared with all other methods of determining CO. Pressure-volume loops were successfully obtained with the modified pump.



CONCLUSION We report for the first time that an Impella CP pump can be fitted with admittance electrodes and used to determine native CO with fidelity similar to traditional methods in various hemodynamic situations.

CATEGORIES CORONARY: Hemodynamic Support and Cardiogenic Shock

TCT-68

Complete Revascularisation in Patients Presenting With ST-Segment Elevation MI, Cardiogenic Shock, and Multivessel Disease Is Associated With Higher Mortality at 30 Days, 1 Year, and up to 30 Months of Follow-Up

Alexander Tindale,¹ Vasileios Panoulas²

¹Royal Brompton and Harefield Hospitals, Guy's And St Thomas' NHS Foundation Trust, East Horsley, United Kingdom; ²Royal Brompton and Harefield Hospitals, Guy's And St Thomas' NHS Foundation Trust, London, United Kingdom

BACKGROUND Complete revascularisation (CR) in patients undergoing percutaneous intervention (PCI) for acute coronary syndromes (ACS) with cardiogenic shock (CS) is associated with higher 30-day and 1-year mortality than culprit-lesion-only PCI (CLOP) in randomized and observational studies. However, there is significant heterogeneity across the trials in terms of shock definitions, proportions of patients presenting with ST-segment elevation myocardial infarction (STEMI), definitions of multi-vessel disease (MVD) and follow-up length. This observational study sought to use registry data to assess associations between CR and mortality at 30-day, 1-year and 2.5-year follow-up in patients presenting with STEMI, CS and MVD, where CS was defined solely as arterial lactate >2 mmol/L.

METHODS Data from 13,209 patients presenting to our tertiary referral center for PCI were screened. Of these, 408 presented with STEMI, lactate >2 mmol/L, MVD and no significant left main stem disease. Univariate, multivariate and propensity-matched analysis was performed.

RESULTS Of these 408 patients, 74 (18.1%) underwent CR, the remainder CLOP. The unadjusted death rate at 30 days and 1 year was higher in CR (39.2% vs 27.5%, $P = 0.007$; 47.3% vs 33.8%, $P = 0.007$). When adjusted for significant confounders (age, lactate, cardiac arrest and radial access), the mortality rate at 30 days and 1 year remained higher with CR vs CLOP (OR 2.1 (1.02-4.2), $P = 0.043$; and OR 2.4 (1.2-4.9), $P = 0.01$). Cox regression with a median follow-up of 2.5 years showed a similar picture of higher mortality associated with CR (HR 1.6 (1.1-2.3), $P = 0.012$). Propensity matching was performed for 134 patients using the same confounding variables plus smoking status, diabetes, mechanical ventilation, previous ACS, creatinine and ECMO use. CR was independently associated with 30-day and 1-year mortality (OR 3.6 (1.3-10.0), $P = 0.013$; and OR 2.6 (1.1-6.2) $P = 0.027$) as well as lower survival over the duration of follow-up (HR 2.2 (1.3-3.8), $P = 0.004$).

CONCLUSION In both adjusted and unadjusted analyses, complete revascularization was associated with increased mortality rates at 30 days and 1 year, and lower long-term survival, than CLOP in patients presenting with STEMI, CS and MVD.

CATEGORIES CORONARY: Hemodynamic Support and Cardiogenic Shock

TCT-69

Impella Use for Fulminant Myocarditis in Cardiogenic Shock: Analysis of the Japan Registry for Percutaneous Ventricular Assist Device (J-PVAD)



Koichi Toda,¹ Junya Ako,² Yuki Ikeda,³ Koichiro Kinugawa,⁴ Yoshio Kobayashi,⁵ Minoru Ono,⁶ Satoshi Yasukochi⁷

¹National Center for Child Health and Development, Tokyo, Japan; ²Kitasato University, Sagami-hara, Japan; ³School of Medicine, Kitasato University, Sagami-hara, Japan; ⁴Toyama University Cardiovascular center, Toyama, Japan; ⁵Chiba University, Chiba, Japan; ⁶Graduate School of Medicine, University of Tokyo, Tokyo, Japan; ⁷Nagano Children's Hospital Heart Center, Azumino/Nagano, Japan

BACKGROUND Fulminant myocarditis (FM) requiring mechanical circulatory support (MCS) has a high mortality rate. We explored the utility of Impella treatment for FM patients in cardiogenic shock using the Japan Registry for Percutaneous Ventricular Assist Device (J-PVAD).

METHODS All Japanese patients treated with Impella 2.5, CP, or 5.0 pumps were registered in J-PVAD. Between October 2017 and January 2020, 1,344 patients at 109 accredited institutes were enrolled. We investigated baseline characteristics and clinical outcomes of 143 patients who were diagnosed with cardiogenic shock due to FM.

RESULTS Mean values for age and body surface area were 51 ± 20 years and 1.64 ± 0.18 m², respectively. Intra-aortic balloon pump (IABP) was used in 70 patients (49%), 26 (18%) required cardiopulmonary resuscitation, and serum lactate levels were >4.0 mmol/L in 63 (44%) before Impella implantation. Impella 5.0 was used in 52 (36%) and 104 (73%) received combination therapy of Impella and veno-arterial extracorporeal membrane oxygenation (VA-ECMO). Average support duration was 8.1 ± 5.3 days in patients with single Impella support and 11.9 ± 7.6 days in patients with combined Impella and VA-ECMO support. Cardiac recovery rate (indicated by MCS-free survival) and cumulative survival rate at 30 days after Impella implantation were 59% and 77%, respectively. Four (2.8%) patients who could not be weaned from Impella were bridged to long-term ventricular assist device therapy, while 23 (16%) patients died during Impella support. Of 4 significant risk factors identified by univariate analysis, multivariate analysis with Cox proportional hazard regression revealed that age and BNP ≥ 200 pg/mL were significant risk factors for death.

CONCLUSION In this largest experience of Impella treatments for fulminant myocarditis in cardiogenic shock, we found that the use of Impella with and without VA-ECMO were safe and effective. Further study is necessary to elucidate the survival benefit of Impella in comparison with VA-ECMO in patients with cardiogenic shock due to FM.

CATEGORIES CORONARY: Hemodynamic Support and Cardiogenic Shock

CARDIOGENIC SHOCK AND HEMODYNAMIC SUPPORT II

Abstract nos: 70-74

TCT-70

Clinical Predictors of Patients Requiring Prolonged Mechanical Circulatory Support After High-Risk PCI



Mir Basir,¹ Alejandro Lemor,¹ Yanru Li,² Bjorn Redfors,² Alexander Truesdell,³ Aditya Bharadwaj,⁴ Amir Kaki,⁵ David Wohls,⁶ Perwaiz Meraj,⁷ Ramesh Daggubati,⁸ Cindy Grines,⁹ William O'Neill,¹ Jeffrey Moses¹⁰

¹Henry Ford Hospital, Detroit, Michigan, USA; ²Cardiovascular Research Foundation, New York, New York, USA; ³Virginia Heart/Inova Heart and Vascular Institute, McLean, Virginia, USA; ⁴Loma Linda University, Loma Linda, California, USA; ⁵Ascension St John Hospital, Detroit, Michigan, USA; ⁶Spectrum Health Meijer Heart And Vascular Institute, Grand Rapids, Michigan, USA; ⁷Northwell Health, Manhasset, New York, USA; ⁸West Virginia University School of Medicine, Morgantown, West Virginia, USA; ⁹Northside Hospital, Atlanta, Georgia, USA; ¹⁰St Francis Hospital and Heart Center, Roslyn, New York, USA

BACKGROUND There are limited data on predicative parameters to guide weaning after high-risk percutaneous coronary intervention (HRPCI) requiring mechanical circulatory support (MCS).

METHODS Patients enrolled into the prospective, multicenter, adjudicated, PROTECT III study who underwent HRPCI with Impella MCS were evaluated. Patients who required prolonged MCS, defined as requiring ongoing MCS beyond the index PCI, were compared to those in whom MCS was successfully weaned and explanted after index PCI.

RESULTS 1,196 patients were treated at 46 sites between 2017 and 2020. 207 patients (17%) required prolonged support with a mean duration of support of 27.3 ± 34.2 compared to 1.8 ± 5.8 hours for those not requiring prolonged support. Age, gender, and baseline comorbidities were similar between groups. Patients requiring prolonged support had a lower left ventricular ejection fraction (27.3 vs 31.8, $P = 0.02$), lower blood pressure (BP) pre-PCI (120 vs 126, $P < 0.01$) and during PCI (121 vs 131, $P < 0.01$), and higher heart rate pre-PCI (80 vs 76, $P < 0.01$) and during PCI (82 vs 76, $P < 0.01$). Patients requiring prolonged support were more likely to undergo urgent PCI (62 vs 49%, $P < 0.01$), present with acute coronary syndrome (ACS) (44.9 vs 29.7%, $P < 0.01$) and were more likely to experience intra-procedural complication (9.1 vs 3.9%, $P < 0.01$). Patients requiring prolonged support were also more likely to die during the hospitalization (10.6% vs 2.8%, $P < 0.01$) and experience major adverse cardiac and cerebral events (MACCE) at 90 days (23.4 vs 13.9%, $P < 0.01$). The need for prolonged hemodynamic support was significantly associated with cardiovascular death using logistic regression (OR 2.49, $P = 0.04$).

CONCLUSION Patients requiring prolonged support after HRPCI present with more urgent indications for PCI (ie, acute coronary syndrome) and are more likely to have intra-procedural complication. These patients have lower baseline ejection fractions, lower blood pressure, and are more likely to experience in-hospital death and 90-day MACCE.

CATEGORIES CORONARY: Complex and Higher Risk Procedures for Indicated Patients (CHIP)

TCT-71

Trend, Predictors, and Outcomes of Cardiogenic Shock in Asian Population: A Nationwide Inpatient Sample Database Study

Harigopal Sandhyavenu,¹ Irisha Badu,² Waqas Ullah,³ Aravind Reddy Polam,¹ Tanveer Mir,⁴ Anoop Titus,⁵ Yevgeniy Brailovsky,⁶ Indranee Rajapreyar,⁶ Saraschandra Vallabhajosyula,⁷ M Chadi Alraies⁸
¹Weiss Memorial Hospital, Chicago, Illinois, USA; ²Onslow Memorial Hospital, Jacksonville, North Carolina, USA; ³Thomas Jefferson University Hospitals, Philadelphia, Pennsylvania, USA; ⁴Wayne State University, Detroit, Michigan, USA; ⁵Saint Vincent Hospital, Worcester, Massachusetts, USA; ⁶Thomas Jefferson University Hospital, Philadelphia, Pennsylvania, USA; ⁷Wake Forest University School of Medicine, Greensboro, North Carolina, USA; ⁸Detroit Medical Center, Detroit, Michigan, USA

BACKGROUND Current understanding of outcomes of cardiogenic shock (CS) in Asian populations is limited. We aim to study the clinical outcomes of CS in Asian population compared with non-Asians.

METHODS The National Inpatient Sample (NIS) database was queried between 2002-2019 to identify hospitalizations with CS. Race was classified as Asians and non-Asians. The adjusted odds ratios (aOR) for in-hospital outcomes were calculated using a propensity-score matched (PSM) analysis.

RESULTS A total of 1,573,285 hospitalizations were identified between 2002-2019 for CS, of which 48,398 (3%) were Asian and 1,524,887 (97%) were non-Asians. Adjusted odds of in-hospital mortality (aOR 0.89, 95% CI 0.87-0.92) was significantly lower, while the odds of need for coronary artery bypass graft (CABG) (aOR 1.10, 95% CI 1.06-1.15), use of extracorporeal membrane oxygenation (ECMO) (aOR 1.29, 95% CI 1.13-1.46), and intra-aortic balloon pump (IABP) (aOR 1.21, 95% CI 1.17-1.25) was significantly higher in Asian population. Asians also had a lower rate of use of Impella (aOR 0.82, 95% CI 0.77-0.88), but no difference in the use of left ventricular assist devices (LVAD) (aOR 1.05, 95% CI 0.93-1.19) compared with non-Asians (Table).



	Unmatched				Matched			
	Non-Asian (N=1,524,887)	Asian (N=48,398)	OR (95% CI)	P-value	Non-Asian (N=48,346)	Asian (N=48,398)	OR (95% CI)	P-value
In-hospital mortality	36.30%	37.60%	1.06 (1.04-1.08)	<0.001	40.30%	37.60%	0.89 (0.87-0.92)	<0.001
Sepsis	22.60%	25.90%	1.2 (1.17-1.22)	<0.001	29.50%	25.90%	0.84 (0.82-0.86)	<0.001
Septic shock	14%	16.5%	1.21 (1.18-1.24)	<0.001	19.3%	16.5%	0.83 (0.80-0.86)	<0.001
stroke	3.40%	3.60%	1.06 (1.01-1.11)	0.03	3.30%	3.60%	1.08 (1.01-1.015)	0.04
Vascular complications	0.90%	0.80%	0.83 (0.75-0.92)	<0.001	0.80%	0.80%	0.98 (0.85-1.13)	0.8
CABG	10.90%	12.00%	1.11 (1.08-1.15)	<0.001	11.00%	12.00%	1.10 (1.06-1.15)	<0.001
RHC	6.30%	5.30%	0.85 (0.81-0.88)	<0.001	5.10%	5.30%	1.05 (0.99-1.12)	0.07
ED	8.50%	11.70%	1.41 (1.37-1.45)	<0.001	18.40%	11.70%	0.59 (0.57-0.61)	<0.001
Tracheostomy	2.60%	2.60%	1.02 (0.96-1.08)	0.6	2.20%	2.60%	1.21 (1.11-1.31)	<0.001
PEG	3.10%	3.90%	1.29 (1.23-1.35)	<0.001	4.00%	3.90%	0.99 (0.95-1.06)	0.78
Pulmonary support								
Ventilation								
All	50.40%	55.40%	1.22 (1.20-1.24)	<0.001	56.20%	55.40%	0.97 (0.94-0.99)	0.008
Chronic	18.30%	20.80%	1.17 (1.15-1.20)	<0.001	21.40%	20.80%	0.97 (0.94-0.99)	0.03
Circulatory support								
ECMO	0.90%	1.10%	1.2 (1.10-1.31)	<0.001	0.90%	1.10%	1.29 (1.13-1.46)	<0.001
Impella	3.00%	3.10%	1.04 (0.98-1.09)	0.19	3.70%	3.10%	0.82 (0.77-0.88)	<0.001
IABP	19.90%	22.60%	1.18 (1.15-1.20)	<0.001	19.50%	22.60%	1.21 (1.17-1.25)	<0.001
LVAD	1.4%	1.1%	0.75 (0.69-0.82)	<0.001	1.00%	1.1%	1.05 (0.95-1.19)	0.42
Resource utilization								
Length of stay (days)					11.81±15.04	11.8±15.67		0.96
Total charges (\$)					\$6307±76120	\$3787±80261		<0.001

Values are presented as percentages or mean ± standard deviation. OR - odds ratio; CABG - coronary artery bypass grafting; RHC - right heart catheterization; ED - hemodialysis; PEG - percutaneous endoscopic gastrostomy; ECMO - extracorporeal membrane oxygenation; IABP - intra-aortic balloon pump

CONCLUSION Asian populations have a higher prevalence of CS, but lower in-hospital mortality when compared with non-Asians that could potentially be attributed to the higher utilization of mechanical circulatory support devices. Further studies are necessary to determine the implications of race on outcomes in CS.

CATEGORIES CORONARY: Hemodynamic Support and Cardiogenic Shock

TCT-72

Early Versus Late CABG in Patients Presenting With NSTEMI and Cardiogenic Shock: A Nationwide Analysis

Ahmed Maraey,¹ Mahmoud Khalil,² Abdelaziz Elhendawy,³ Hadeer Elsharnoby,⁴ Ahmed Elzanaty,⁵ Venugopal Brijmohan Bhattad,⁶ Mohammed Hassan⁷
¹St Alexius Health, Bismarck, North Dakota, USA; ²Lincoln Medical Center, Bronx, New York, USA; ³Tanta University Faculty of Medicine, Tanta, Egypt; ⁴Carle Foundation Hospital, Urbana, Illinois, USA; ⁵University of Toledo, Toledo, Ohio, USA; ⁶Boston University Medical Center, Worcester, Massachusetts, USA; ⁷Lakeland Medical Center, Lakeland, Florida, USA



BACKGROUND Optimum timing for coronary artery bypass graft (CABG) in non-ST-segment elevation acute coronary syndrome (NSTEMI) complicated with cardiogenic shock (CS) is unclear due to limited available data.

METHODS National Readmission Database (NRD) of years 2016-2018 was queried adult admissions with NSTEMI and CS who underwent early CABG. Admissions were stratified according to the timing of CABG into early (on day 0 or day 1) and late (on day 2 or beyond). Categorical variables were compared using the χ^2 test, and continuous variables were compared using the Student *t* test. Multivariate logistic regression was used to adjust for confounders and calculate the adjusted odds ratio (aOR).

RESULTS A total of 15,001 patients (mean age 67 ± 8.9 and 30% female) were included in our study of whom 22% underwent early CABG. Age was not different between both groups (66.9 in early vs 67.5 in late groups; $P = 0.093$). More patients with higher Charlson comorbidity index (≥ 3) in the late group compared to the early group (81% vs 67%; $P < 0.001$). Early CABG was associated with increased utilization of intra-aortic balloon pump (IABP) but associated with decreased 30-day all-cause readmission and length of stay ($\beta = -5.4$ days; $P < 0.001$). No difference in in-hospital mortality, acute respiratory failure, acute liver injury, or use of mechanical support devices other than IABP (Figure).