

## Cardiogenic Shock: A Single-Center, Three-Year Exploratory Study

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### Published In/Presented At

Krantzler, S. N., Burke, J. A., (2019, August). *Cardiogenic Shock: A Single-Center, Three-Year Exploratory Study*. Poster Presented at: LVHN Research Scholar Program Poster Session, Lehigh Valley Health Network, Allentown, PA.

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# Cardiogenic Shock: A Single-Center, Three-Year Exploratory Study

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## INTRODUCTION

- Cardiogenic Shock (CS) is a high-acuity, potentially complex, and hemodynamically diverse state of end-organ hypoperfusion that is frequently associated with multisystem organ failure. Although survival has improved in recent years, patient morbidity and mortality remain high, and there are few evidence-based therapeutic interventions known to significantly improve patient outcomes.<sup>1</sup>
- The clinical presentation of CS is typically characterized by persistent hypotension unresponsive to volume replacement and is accompanied by clinical features of end-organ hypoperfusion requiring intervention with pharmacological or mechanical support, such as Intraaortic Balloon Pump (IABP), Impella, or Extracorporeal Membrane Oxygenation (ECMO).<sup>1</sup>
- An analysis of the Nationwide Inpatient Sample Database between 2003 and 2010 reported an increase in the prevalence of CS in the overall population and among patients >75 years of age presenting with STEMI.<sup>1</sup>

## OBJECTIVE

This retrospective analysis of fiscal years 2016-2019 was conducted to visualize the demographic composition of a cardiogenic shock patient population (n=1534) in addition to the hemodynamic profile of a STEMI patient population (n=260), which was a subset of the CS population.

## METHODS

This study was approved by Institutional Review Board (IRB, study number 00000298).

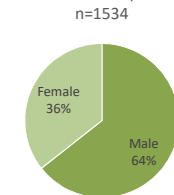
A cohort of patients was extracted from Epic using Webi via 2019 ICD-10-CM Diagnoses Code R57.0 (Cardiogenic Shock) that was both primary and subsequent. This technique was also used to find the population of STEMI patients within this cohort.

The demographic information for CS patients (n=1534) and the hemodynamic lab values, presenting symptoms, and MCSD usage for STEMI patients (n=260) was collected and stored using EPIC and REDCap for patients at LVHN-CC, including transfers. Patients were then sorted into the fiscal year in which they presented to the hospital with their condition.

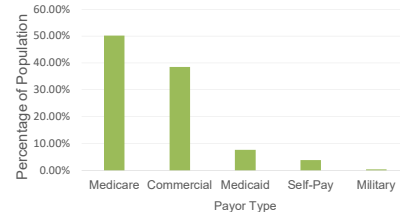
## POPULATION DEMOGRAPHICS

|       |            | Prevalence and Mortality for CS and STEMI during FY's 2016-19 |                 |                 |                 |
|-------|------------|---------------------------------------------------------------|-----------------|-----------------|-----------------|
|       |            | FY 19                                                         | FY 18           | FY 17           | FY 16           |
| CS    |            | 425                                                           | 419             | 402             | 287             |
|       | Prevalence | 273 M vs. 152 F                                               | 270 M vs. 149 F | 265 M vs. 137 F | 180 M vs. 107 F |
|       | Mortality  | Total: 36.2%                                                  | Total: 32.9%    | Total: 32.33%   | Total: 32.7%    |
|       |            | M 99/154                                                      | M 78/138        | M 78/130        | M 61/94         |
|       |            | F 55/154                                                      | F 60/138        | F 52/130        | F 33/94         |
| STEMI | Prevalence | 18.35%                                                        | 14.10%          | 15.17%          | 21.25%          |
|       | Mortality  | Total: 38.4%                                                  | Total: 44.1%    | Total: 32.8%    | Total: 32.7%    |
|       |            | M 18/30                                                       | M 18/26         | M 11/20         | M 11/19         |
|       |            | F 12/30                                                       | F 8/26          | F 9/20          | F 8/19          |

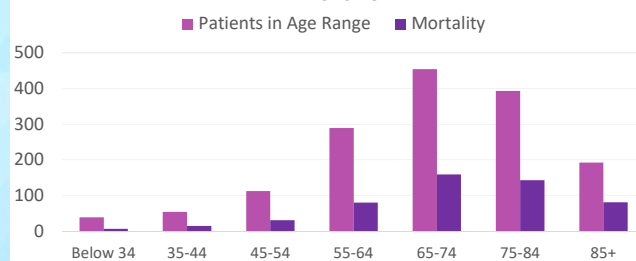
Gender of CS Population n=1534



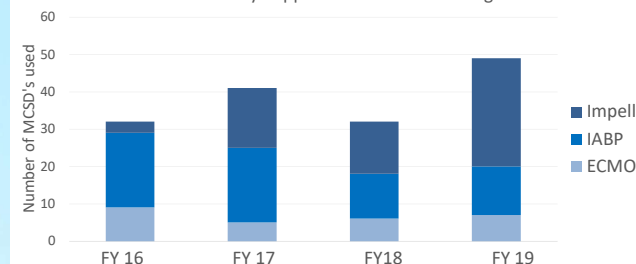
Payor Type by % for CS Population (n=1534)



Patient Population and Mortality per Age Range during FY 2016-19



Mechanical Circulatory Support Devices Used during FY 2016-19



## NOTABLE FINDINGS

- Throughout FY 2016-2019, 63-66% of the CS population was male and there was a 32-36% mortality rate for all patients.
- Patients within the age range of 35-64 had an overall average mortality rate of 27.73%.
- MCSD usage has significantly shifted in favor of Impella over IABP from 2016/17 to 2019 (p=0.0489) while ECMO usage has remained consistent over time. This finding is supported by IABP-SHOCK II Trial Investigators who found that patients with acute MI complicated by CS did not benefit with routine IABP placement in addition to revascularization.<sup>2</sup>

## FUTURE DIRECTION

- NSTEMI patients within the CS population should be analyzed for PCI/MCSD usage and their hemodynamic values should be recorded to augment hemodynamic data for further investigation.
- A crosswalk should be performed to compare patients identified as CS via ICD-10-CM diagnoses codes with clinical criteria to improve the internal validity of population inclusion.
- Trends in comprehensive hemodynamic measurements collected during right heart catheterization procedures for both STEMI and NSTEMI shock patients should be analyzed further for values that may correlate with mortality rates.

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