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# Cardiogenic shock patients on VA-ECMO with/without unloading from Impella

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## BACKGROUND

- Cardiogenic shock (CS) occurs when perfusion needs are not being met due persistent hypotension and a low cardiac output from the left ventricle. <sup>1</sup>
- Veno-arterial extracorporeal membrane oxygenation (VA-ECMO) provides full cardiopulmonary support temporarily to CS patients awaiting further treatment. <sup>2</sup>
- Due to afterload caused by VA-ECMO, it can be beneficial to use unloading strategies , such as an Impella heart device to provide further support to the left ventricle. <sup>3</sup>

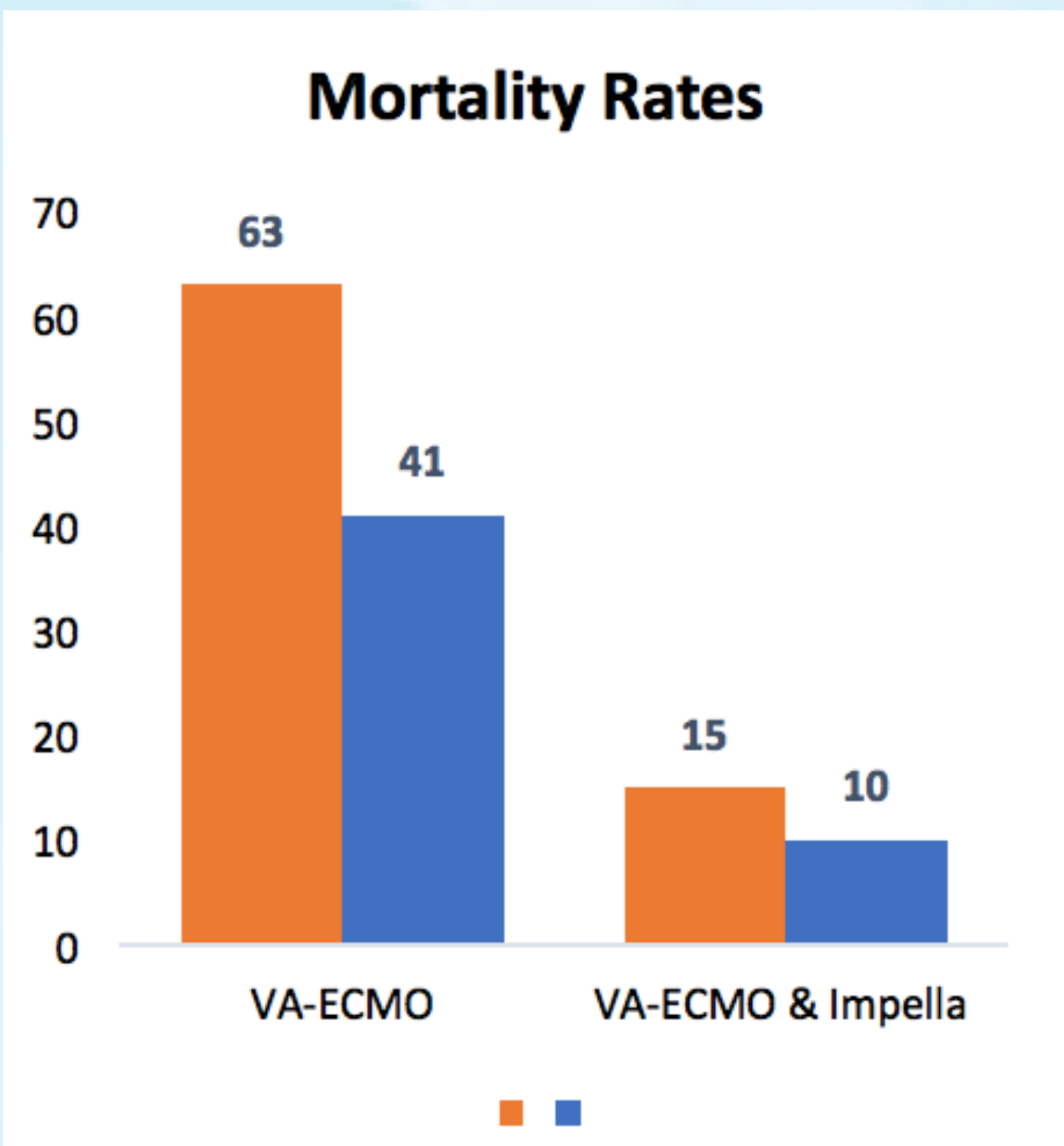
## OBJECTIVE

- Since the literature remains undecided regarding the benefit of unloading the left heart, this study investigates the outcomes of VA-ECMO patients with and without the Impella heart device at the Lehigh Valley Health Network.

## METHODS

- Retrospective chart review of patients receiving VA-ECMO at Lehigh Valley Hospital from 2013-2018
- 25 patients on VA-ECMO & Impella
- 104 patients on VA-ECMO only
- Analysis of patient demographics, outcomes, and comorbidities

## OUTCOMES



**Figure 1:** Outcomes were determined at the time of discharge for cardiogenic shock patients receiving VA-ECMO or VA-ECMO/Impella.

## RESULTS

- VA-ECMO only group had a 39.4% survived to discharge
- VA-ECMO & Impella group had a 40% survival to discharge
- 73% of those who had renal failure pre surgery died in both groups
- An alternative heart device, IABP was used on 7 patients with an increased survival of 57.1% to discharge
- Previous VA-ECMO study confirms about 43% survival.

## CONCLUSION

- Similar outcomes between the two groups suggest no clear advantage of unloading the left ventricle with Impella.
- A higher survival rate with IABP might suggest future studies regarding its' outcome.
- Renal failure pre-surgery can be an indicator for an increased mortality risk, since VA-ECMO alone has shown the same mortality.
- Future studies: matched patients and larger cohort.

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|                             | VA-ECMO Only<br>n=104 |       |          | VA-ECMO & Impella<br>n=25 |       |          |
|-----------------------------|-----------------------|-------|----------|---------------------------|-------|----------|
| Preoperative                | n                     | %     | Died (%) | n                         | %     | Died (%) |
| Age (years)                 | 55.5                  | -     | -        | 61.6                      | -     | -        |
| Males                       | 77                    | 74%   | 59.7%    | 17                        | 68%   | 52.9%    |
| EF < 30%                    | 28                    | 32.9% | 85.7%    | 14                        | 56%   | 71.4%    |
| EF > 30%                    | 57                    | 67.1% | 35%      | 8                         | 32%   | 62.5%    |
| Previous cardiac arrest     | 63                    | 61.8% | 68%      | 14                        | 56%   | 64%      |
| Previous MI                 | 38                    | 37.6% | 57.9%    | 13                        | 54.2% | 46%      |
| Previous open heart surgery | 33                    | 33%   | 54.5%    | 7                         | 28%   | 57%      |
| Chronic renal disease       | 52                    | 51.5% | 65.4%    | 10                        | 40%   | 80%      |
| CAD                         | 45                    | 44.6% | 51.1%    | 14                        | 56%   | 71%      |
| Hypertension                | 60                    | 58.8% | 56.7%    | 12                        | 48%   | 66.7%    |
| DM                          | 36                    | 36%   | 63.9%    | 10                        | 40%   | 90%      |
| Renal Dialysis              | 50                    | 51.5% | 66%      | 7                         | 28%   | 86%      |
| Renal pre surgery           | 41                    | 40.2% | 73%      | 15                        | 60%   | 73%      |
| Renal Post surgery          | 81                    | 80.2% | 55%      | 19                        | 76%   | 57%      |

**Figure 2:** Secondary outcomes and comorbidities of patients on VA-ECMO and VA-ECMO/Impella.