Letters

TO THE EDITOR

Clinical Implication of Transvalvular Unloading With Venoarterial Extracorporeal Membrane Oxygenation Support in Acute Myocardial Infarction

We congratulate the clinically relevant and comprehensive study by Everett et al[1] exploring the impact of extracorporeal membrane oxygenators (ECMOs) on myocardial infarct size and would like to raise some discussion points to better understand their insightful findings.

In patients with EC-Pella support, optimal flow balance between 2 pumps, Impella and ECMO, is an unresolved topic. The authors described that, "For the Impella-ECMO group, mean Impella flow was 3.4 ± 0.2 L/min and 3.8 ± 0.4 L/min before and after initiation of ECMO, respectively. ECMO flow was 2.9 ± 0.5 L/min in this group." We would like to clarify this statement because there is a discrepancy between these flow data and the numbers in Table 1, which presents Impella flow as "2.2 ± 0.7 L/min" in the Impella-ECMO group. With ECMO-first followed by Impella, Impella CP flow is almost always lower than venoarterial (VA) ECMO flow after escalating to EC-Pella support unless the flow is extremely controlled. We recently reported the efficacy of higher Impella flow with the use of Impella 5.5 with partial ECMO support in the setting of EC-Pella, which offers higher antegrade transvalvular flow while reducing afterload from VA-ECMO.[2] Therefore, it would be interesting to see how this "EC-Pella 5.5" strategy, with more left ventricular unloading, affects hemodynamics, infarct area, and cardioprotective signaling results in this experimental model.

When interpreting the outcome regarding different hemodynamics between "Impella-first followed by ECMO" and "ECMO-first followed by Impella" for EC-Pella indications, the definition of "maximal speed without suction" as device flow may not necessarily represent an equivalent flow configuration for the purpose of comparing hemodynamics between Impella-first and ECMO-first approaches. In the Impella-first group during the 45-minute intervention, aortic pressure consistently exceeded left ventricular pressure throughout the cardiac cycle, indicating that the aortic valve remained closed owing to unloading. This suggests that the influence was significantly affected by which device controlled the dominant flow, rather than the order of device insertion. Therefore, comparison with the equivalent device flow between the EC-Pella groups may provide a more accurate answer regarding the sequence of devices.

Another interesting question would be how ECMO with intra-aortic balloon pump (IABP) configuration affects the results in this experimental model, because previous clinical studies have elicited a relationship between ECMO-IABP and EC-Pella.[3] Better understanding of ECMO-IABP configuration may be important because clinically many patients with acute myocardial infarction receive IABP first which is expeditious, safe, and often used with VA-ECMO.

If the authors could comment on these points, it would add significant insights on their interesting study.

Vasiliki Gregory, BS
Tomoki Sakata, MD, PhD
Ameesh Isath, MBBS
Kiyotakke Ishikawa, MD, PhD
***Suguru Ohira, MD, PhD**

*Division of Cardiothoracic Surgery
Department of Surgery
Westchester Medical Center/New York Medical College
100 Woods Road
Valhalla, New York 10595, USA
E-mail: suguru.ohira@wmchealth.org

https://doi.org/10.1016/j.jacbts.2023.05.018

JACC: BASIC TO TRANSLATIONAL SCIENCE VOL. 8, NO. 9, 2023
SEPTEMBER 2023:1243–1244

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the Author Center.

REFERENCES

1. Everett KD, Swain L, Reyelt L, et al. Transvalvular unloading mitigates ventricular injury due to venoarterial extracorporeal membrane oxygenation in acute myocardial infarction. *J Am Coll Cardiol Basic Trans Science*. 2023;8(7):769–780.

2. Ohira S, Pan S, Levine A, et al. High flow from Impella 5.5 with partial veno-arterial extracorporeal membrane oxygenation support: case series. *Artif Organs*. 2022;46(6):1198–1203.

3. Grandin EW, Nunez JI, Willar B, et al. Mechanical left ventricular unloading in patients undergoing venoarterial extracorporeal membrane oxygenation. *J Am Coll Cardiol*. 2022;79(13):1239–1250.