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Journal of Clinical & Experimental Cardiology

Commentary

Reflections on IABP and ECMO Studies: Efficacy and the Future

Zelin Chen*, Yuping Gao, Yuanyuan Lin

Department of Cardiovascular Medicine, Third Hospital of Shanxi Medical University, Taiyuan, China

DESCRIPTION

The effectiveness of Mechanical Circulatory Support (MCS), including Intra-Aortic Balloon Pump (IABP) and Veno-Arterial Extracorporeal Membrane Oxygenation (VA-ECMO), in managing Cardiogenic Shock (CS) has long been a subject of contentious debate. Therefore, it is crucial to objectively analyze previous research findings and strategically select and apply appropriate MCS interventions to maximize improvement in patient outcomes.

In our previous review, we discussed the Intra-Aortic Balloon Pump (IABP) as a traditional method for treating Cardiogenic Shock (CS) and its position in the context of the widespread adoption of Veno-Arterial Extracorporeal Membrane Oxygenation (VA-ECMO) [1]. Despite the broad application and research trends in VA-ECMO, IABP will continue to play its unique and essential role. With the continuous improvement of guidelines and rapid access for heart pain, etiological therapy of CS undoubtedly is the most critical. However, we cannot overlook the significant role of circulatory support devices, which provide a lifeline for patients who have suffered severe cardiac damage, allowing their bodies to catch a breath and recover. Among these devices, the IABP stands out as the most classic and widely used tool for Mechanical Circulatory Support (MCS), while VA-ECMO, which emerged later, offered an even higher level of circulatory support. Despite so much therapeutic interventions, the mortality rate of cardiogenic shock remains stubbornly high. What's worse, numerous studies on MCS have cast doubt on its ability to significantly improve patient outcomes. It causes intense debates and controversies about the effectiveness of MCS. Therefore, it is time for us to critically assess the current progress in MCS research and reflect on its trajectory. Moreover, we need to look ahead and explore the fate of MCS in the management of cardiogenic shock.

Reflection on the study

The negative results from a series of studies, including the IABP SHOCK II trial, have sparked controversy over the effectiveness of IABP and further diminished its position in the treatment of CS. As for VA-ECMO, inspite of considerable clinical experience, there is still a lack of large-scale prospective randomized controlled trial data to confirm its impact on prognosis of CS patients [2]. While ECMO clearly outperforms IABP in maintaining hemodynamics, but existing research suggested that ECMO has not demonstrated the overwhelming advantage as we anticipated. Compared with conventional conservative treatments, its potential to improve clinical outcomes in CS patients remains uncertain [3]. Moreover, both of these MCS methods come with the risk of complications, negative studies has been extensively explored that ECMO having a particularly high incidence of complications on patient survival [4,5]. In fact, the current evidence regarding the use of MCS to improve patient survival remains uncertain and even tends towards negative outcomes. This conclusion is influenced by various confounding factors during the research process, such as ventilation methods and medications. However, we believe that the treatment concept may be the most critical reason, specifically the current clinical practice of viewing MCS predominantly as a last-resort treatment. This approach may lead to patients missing the optimal time for MCS implantation. If we fail to address these confounding factors that affect the prognosis of MCS, it is foreseeable that future clinical trials will continue to produce negative results, which will undoubtedly affect our application of MCS. It will be required to guide clinical practice by research findings, but more crucially, we need continuous introspection and improvment of methods to seek truth. It is gratifying that the combination of IABP and VA-ECMO appears to yield promising results, albeit accompanied by higher complications. The combination of these two therapies seems to improve the survival of CS patients. Mechanistically, IABP precisely addresses the unavoidable Left Ventricle (LV) overload of ECMO by reducing pulmonary artery pressure and decreasing LV diameter [6]. Compared with other MCS options, IABP may provide greater clinical benefits and lower economic burdens, potentially becoming the optimal companion to ECMO [7]. Further researches in this regard are undoubtedly important.

Outlook after the study

The effectiveness of IABP and ECMO remains a subject of controversy and uncertainty, but we can find "fragments of truth"

Correspondence to: Zelin Chen, Department of Cardiovascular Medicine, Third Hospital of Shanxi Medical University, Taiyuan, China, E-mail: czl13027075536@163.com

Received: 29-Jul-2023, Manuscript No. JCEC-23-25855; **Editor assigned:** 31-Jul-2023, Pre QC No. JCEC-23-25855 (PQ); **Reviewed:** 14-Aug-2023, QC No. JCEC-22-25855; **Revised:** 21-Aug-2023, Manuscript No. JCEC-23-25855 (R); **Published:** 28-Aug-2023, DOI: 10.35248/2155-9880.23.14.818

Citation: Chen Z, Gao Y, Lin Y (2023) Reflections on IABP and ECMO Studies: Efficacy and the Future. J Clin Exp Cardiolog. 14:818.

from previous researches. At this stage, understanding the characteristics of various MCS options and effectively preventing and managing related complications are crucial directions for clinical practice. Medical decisions should be personalized, taking into account economic factors and unique circumstances of each patient. And in the future, standardized CS grading should be matched as soon as possible with the scientific sequential use of MCS to guide the diagnosis and treatment. Moreover, the optimal timing and selection of the combined use of MCS should also be further explored. Most importantly, significantly improving the mortality of end-stage CS patients is undoubtedly a challenge in the absence of a complete understanding of disease mechanisms. We should not lose confidence in MCS due to negative outcomes in previous studies.

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