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Editorial

Do ECMO First Even in the Desperate Situation

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▸ See the article "Benefit of Extracorporeal Membrane Oxygenation before Revascularization in Patients with Acute Myocardial Infarction Complicated by Profound Cardiogenic Shock after Resuscitated Cardiac Arrest" in volume 51 on page 533.

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Cardiogenic shock (CS) in the setting of acute myocardial infarction (AMI) is a common cause of mortality and no definite management has shown clear clinical favorable outcome so remains challenging despite advances in therapeutic options. Among them, intra-aortic balloon pump (IABP) was the cornerstone of mechanical circulatory support for patients with CS in AMI. However, randomized clinical trial data have reported no clinical benefit from routine IABP use in patients with CS with AMI.[1)2)]

Recently, veno-arterial extracorporeal membrane oxygenation (ECMO) is a most often used form of temporary mechanical circulatory support. Originating from cardiac surgery and initially developed for temporary lung replacement, ECMO support is now broadly established for cardiorespiratory support. Furthermore, ECMO and ECMO timing is also critical to manage severe COVID-19 patients.[3)]

ECMO provides an optimal cardiac output enabling the use of lower doses of vasoactive drugs and was associated with high survival rates in CS with short- and long-term survival benefits of cardiopulmonary resuscitation (CPR) compared to standard care.[4)5)] However there are no randomized trials on the efficacy and safety of ECMO; therefore, the CS in AMI guidelines suggest that ECMO may be considered for carefully selected patients as a class IIb recommendation.[6)]

The next ECMO issue in the CS in AMI is to decide the timing of ECMO between before and after coronary intervention. Choi et al.[7)] reported ECMO before revascularization therapy was associated with a significantly lower risk of composite in-hospital mortality, left ventricular assist device implantation, and heart transplantation, compared with ECMO insertion after revascularization in patients with AMI complicated by refractory CS without extracorporeal CPR before revascularization.

A key unanswered question of this issue is when to start ECMO in patients with most severe form of CS in AMI with out-of-hospital cardiac arrest (OHCA).

The ideal data set to answer this question is blinded randomization data, however it is difficult to do randomization-controlled study in researches with high mortality and

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morbidity such as ECMO patients in CS, where patients are suffering from a rapidly shifting, severe disease. In these situations, observational studies or registry data give us glimpse of decision making for ECMO initiation for AMI complicated by CS with OHCA.[8)9)]

In this issue of *Korean Circulation Journal*, Kim et al.[10)] showed early ECMO before percutaneous coronary intervention (PCI) significantly reduced both in-hospital and 30-day mortality compared to ECMO after PCI. They also showed there was a tendency toward more favorable neurologic outcomes at discharge in patients who received ECMO before PCI than those who received ECMO after PCI. These data support the effective and important role of early ECMO in CS AMI OHCA setting. These data give us another important point to solve. Even though the early initiation of ECMO in CS AMI OHCA, survival rates are still quite low. To make consistent and solid ECMO in the desperate situation, team-based approach is essential to decrease high mortality rate in CS AMI OHCA. To make step by step ECMO implantation in designated spaces is also critical to decrease complication of ECMO and high mortality in desperate patients. If it is difficult to do randomized trials in CS AMI OHCA, more effort is needed to get the detailed information from the good registry.

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