

Outcomes of a modified, low-cost, veno-arterial extracorporeal membrane oxygenation (V-A ECMO) for elective, periprocedural support of high-risk percutaneous cardiac interventions: An experience from a latinamerican center

Abstract

Introduction: High-risk procedures in interventional cardiology include a wide spectrum of clinical and anatomical scenarios related to a higher periprocedural morbidity and mortality. The prophylactic use of short-term mechanical circulatory support (ST-MCS) may improve both the safety and efficacy of the intervention by leading to more stable procedural hemodynamics. However, the significant costs may limit its use in resource constrained settings. To overcome this limitation, we ideated a modified, low-cost, veno-arterial extracorporeal membrane oxygenator (V-A ECMO) setup.

Methods: We conducted an observational prospective study including all patients undergoing a high-risk interventional cardiology procedure at our institution under prophylactic ST-MCS using a modified, low-cost version of V-A ECMO, where some components of the standard V-A ECMO circuit were replaced by supplies used for cardiac surgical cardiopulmonary bypass, achieving a cost reduction of 72%. We assessed in-hospital and mid-term outcomes, including procedural success, post-procedure complications and mortality.

Results: Between March 2016 and December 2021, ten patients underwent high-risk IC procedures with prophylactic use of V-A ECMO. Isolated percutaneous intervention (PCI) was performed in six patients, isolated transcatheter aortic valve replacement (TAVR) in two, and a combined procedure (PCI + TAVR) in two. Mean ejection fraction was 34% (range 20–64%). Mean STS PROM was 16.2% (range 9.5–35.8%) and mean EuroScore was 23.7% (range 1.5–60%). The planned intervention was successfully performed in all cases. There were no reports of V-A ECMO malfunction. In nine patients the VA-ECMO was withdrawn immediately after the procedure but one patient required extended - 24 h - support with no significant issues. One patient experienced a periprocedural myocardial infarction and another developed a femoral pseudoaneurysm. In-hospital and 30-day survival were 100%, and 1-year survival was 80%.

Conclusions: High-risk procedures in interventional cardiology can be successfully performed under prophylactic ST-MCS using a modified, low-cost V-A ECMO, suitable for limited-resource settings.