The right technology for the right ventricular dysfunction: Are we facing the right way?

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Disclosures: Authors have nothing to disclose with regard to commercial support.

Received for publication June 4, 2018; revisions received June 4, 2018; accepted for publication June 5, 2018; available ahead of print July 26, 2018.

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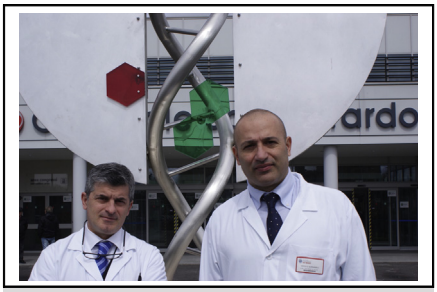
J Thorac Cardiovasc Surg 2018;156:2153-4

0022-5223/$36.00

https://doi.org/10.1016/j.jtcvs.2018.06.008



Francesco Formica, MD (*left*), and Stefano D'Alessandro, MD, FECTS (*right*).

Central Message

The venopulmonary extracorporeal life support is a technique to temporarily assist a failed right heart after LVAD implant. The results are promising, but the oxygenator might limit a wider use.

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Right ventricular failure (RVF) after left ventricular assist device (LVAD) implantation is a dramatic clinical condition with a very poor early and midterm outcome, as reported by the Interagency Registry for Mechanically Assisted Circulatory Support (INTERMACS) registry.[1] Patients with severe RVF sometimes require a temporary right ventricular assist device (RVAD), with an incidence ranging from 5% to 33%.[2-5] Different technologies have been described to assist the right ventricle during RVF, such as extracorporeal membrane oxygenation (ECMO), surgical cannulation of the right atrium and the main pulmonary artery,[6] or total percutaneous RVAD implantation through the femoral and the jugular veins.[7] The limited experiences with these different RVAD models do not allow a wide application of these technologies.

In this issue of the *Journal*, Shehab and colleagues[2] report on their experience of 23 patients receiving concomitant LVAD and a temporary RVAD represented by a venopulmonary extracorporeal life support (VPA-ECLS) with an integrated oxygenator. VPA-ECLS was instituted through an inflow cannula inserted in the femoral vein and an outflow cannula inserted into an 8-mm Dacron graft sutured end-to-side to the main pulmonary artery and tunneled through the precordium. The main aim in using the VPA-ECLS was to avoid surgery for the explant of the support to reduce the high mortality and morbidity rates in these fragile patients.

The authors compared the early and midterm outcome of these patients with those receiving initial biventricular (BiVAD) support (n = 14) and isolated LVAD (n = 75). As expected, patients who needed a right heart support (33%) had a high level of comorbidities before LVAD implantation. Survival to discharge of isolated LVAD, VPA-ECLS, and BiVAD patients was 91%, 83%, and 71%, and 1-year survival was 84%, 65%, and 64%, respectively. These results are quite encouraging despite a relatively greater incidence of adverse events (bleeding, infection, and renal dysfunction) in both the VPA-ECLS and BiVAD groups compared with the isolated LVAD subjects. In addition, the greater incidence of INTERMACS class 1 patients in the VPA-ECLS group (48%) compared with subjects in the isolated LVAD group (19%) represents further evidence of the validity of the VPA-ECLS for the treatment of RVF after LVAD implant.

Some concerns may arise regarding the rationale to include the oxygenator. It is well-known that this device increases the risk of systemic inflammation, coagulopathy, and thromboembolism. Saeed and colleagues[5] used this VPA-ECLS only in those patients with lung injury and ECMO support before LVAD insertion. The study of Shehab and colleagues[2] did not demonstrate whether the oxygenator might negatively affect the outcome because they did not have a control group with a temporary RVAD without an oxygenator, although 43% of patients in the VPA-ECLS group were on ECMO before LVAD implant assuming that those patients had a severe lung injury. Lastly, as a reflection of data in a small patient cohort, the authors[2] could not demonstrate a clearer clinical benefit of the VPA-ECLS approach compared with BiVAD in terms of early and midterm outcomes.

Through this meticulous study, Shehab and colleagues[2] have placed particular attention on the treatment of RVF, which remains an insidious complication after LVAD implantation that can be addressed with appropriate technologies.

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