Ventricular assist devices (VAD) and extracorporeal circulatory membrane oxygenation (ECMO) play a role in the management of acute heart failure.\(^1\) As experience grows, the benefits and limitations of these technologies become clearer. We present a case of severe acute heart failure and ARDS with failed conversion from ECMO to a biventricular assist device (BiVAD).

**Case**

A 24-year-old G4P3 woman presented with severe pre-eclampsia and viral myocarditis. Post-partum she developed rapidly progressing biventricular failure requiring emergent initiation of ECMO. The LV did not decompress well (fig 1A) and chest radiographs showed worsening pulmonary edema despite optimal ECMO flows and diuresis. She was taken to the operating room to convert from ECMO to CentriMag (Levitronix LLC, Waltham, MA) continuous flow BiVADs. The RVAD and LVAD cannula were placed in the right atrium, main PA, LV apex and ascending aorta. CPB was weaned while simultaneously increasing flow rates on the RVAD and LVAD. The LV decompressed significantly, but the RV acutely dilated in conjunction with severe PI (figs 1B & 1C). The RVAD outflow cannula site was inspected and no mechanical disruption of the valve was found. Needle cannulation and transduction of the PA showed a mean pressure of 30 mmHg. We did not have the opportunity to estimate the pressure gradient using Doppler. Additional attempts at initiating BiVAD flow failed similarly, despite intravenous and inhaled pulmonary vasodilators. The patient was restarted on ECMO, the LVAD outflow cannula in the LV apex was added as a vent, and the patient was transferred to the intensive care unit. Unfortunately she developed multi-organ failure over the remainder of her stay and passed away.

**Discussion**

Our case demonstrates that significantly increased PVR from severe lung disease may limit the ability to mechanically support the RV. Our patient’s elevated PVR was likely a result of ARDS, explaining its unresponsiveness to LV decompression. A similar failure to initiate RVAD support has been previously described in a patient with undiagnosed idiopathic pulmonary arterial hypertension.\(^2\) Mechanical disruption or turbulence from a proximally placed PA cannula can also result in acute PI and needs to be included in the differential diagnosis.\(^3\) Predicting, preventing and managing RV failure following placement of an LVAD, including the use of RVAD technology, has been investigated.\(^4,5\) However, the limitations of VADs in RV failure with pulmonary arterial hypertension are less clear.\(^6\) Clinicians managing these patients must appreciate that severe lung disease, or other causes of pulmonary hypertension not due exclusively to LV failure, may limit BiVAD or RVAD support.

2. J Heart Lung Transplant 2008; 27:466-8A
3. Case Rep Transplant 2012; 2012:376384
4. Cardiol Clin 2011; 29:599-605