Background:
- Critically ill infants with pulmonary hypertension (PH) refractory to maximal medical therapy may require extracorporeal support.
- Historically, extracorporeal membrane oxygenation (ECMO) has been the only alternative, but is associated with significant morbidity and mortality that may preclude lung transplant in many centers.2
- We present 2 cases of paracorporeal lung assist device (PLAD) placement, using the QUADROX-i Pediatric oxygenator and the NovaLung iLA membrane ventilator).

Case Presentation:

Case 1:
- 21-month old, 7 kg girl (former 31-week twin gestation) with PH secondary to progressive pulmonary venous stenosis
- Initially on dobutamine, dopamine, phentolamine, vasopressin, epinephrine, norepinephrine, and iNO
- Placement of QUADROX-i Pediatric oxygenator (Maquet Cardiopulmonary GmbH, Germany), extubated on Day 6
- Day 19: implantation of Rotaflow (Maquet, Germany) for RV support
- Bilateral lung transplantation on Day 44

Case 2:
- 8-month old, 7 kg boy with refractory PH secondary to alveolar capillary dysplasia
- On iNO, milrinone, bosentan, treprostinil, and tadalafil
- High ventilator settings resulted in recurrent pneumothoraces
- Placement of QUADROX-i Pediatric oxygenator, extubated on Day 9
- Day 15: transitioned to NovaLung iLA (Xenios AG, Germany) for lower resistance
- Bilateral lung transplantation on Day 31

Discussion:
- PLAD consists of a membrane oxygenator interposed between the pulmonary artery and left atrium
- Fewer hemorrhagic and thrombotic complications compared to ECMO

Anesthetic considerations:

Implantation
- Standard lines and monitors for a cardiopulmonary bypass case, including transesophageal echocardiography
- Pre-CPB: challenges arise from severe, refractory pulmonary hypertension and resultant global failure
- Post-CBP:
  - Optimize right heart function to provide flow to device
  - Optimize PVR, as some blood will still flow through the lungs—adequate lung expansion

Post-implantation course
- Clot accumulation may necessitate need for oxygenator changeout
- Prolonged RV failure may trigger right-VAD insertion

References: