LETTER TO THE EDITORS

Prolonged circulatory support with short-term continuous-flow pump in an infant with end-stage heart failure

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Dear Editors,

We report a case of an infant who was successfully supported with Levitronix PediVAS (Levitronix LLC, Waltham, MA) short-term continuous-flow (STCF) pump in both left ventricular assist device (LVAD) and extracorporeal membrane oxygenation (ECMO) settings for 130 consecutive days before he successfully underwent heart transplantation. Mechanical circulatory support (MCS) therapy in infants and small children with end-stage heart failure remains an ongoing clinical challenge because of limited number of suitable devices and lack of quality data from randomized controlled trials.

A male infant was firstly admitted to our institution at the age of 3 weeks for further evaluation and management of dilated cardiomyopathy with signs of left ventricular (LV) failure. Although initially managed with optimal medical therapy, LV systolic function gradually deteriorated in the subsequent months despite high-dose inotropic support and, at the age of 7 months, acute renal failure developed. In the setting of end-stage LV failure and deteriorating end-organ perfusion and with no identifiable cause for cardiomyopathy found during diagnostic work-up, he was listed for heart transplant and the decision was made to proceed with MCS as bridge to transplant. A STCF Levitronix PediVAS pump was used in LVAD setting with left atrial and ascending aortic cannulation using 14 and 12 Fr heparin-coated cannulas, respectively. After 62 days of LVAD support, fulminant mediastinitis urged us to replace the centrally cannulated LVAD circuit with peripheral veno-arterial (VA) ECMO. Again, Levitronix PediVAS pump was used in VA-ECMO setting with right jugular vein and carotid artery cannulation using 14 and 12 Fr heparin-coated cannulas, respectively. Following targeted antibiotic treatment and vacuum-assisted closure therapy, signs of inflammation subsided and the sternum was closed in the subsequent weeks. After 68 days of VA-ECMO support, the patient underwent orthotopic heart transplantation. Surgical procedure and the postoperative course were uneventful. Standard triple immunosuppressive therapy was introduced, and the boy was discharged 20 weeks after the surgery. In the fifth year after transplantation, he is clinically stable with no end-organ dysfunction and managed on outpatient basis.

In the last decades, conventional pediatric MCS strategy embraced ECMO for short-term and pulsatile VADs for long-term support [1]. However, complications such as multiorgan failure, sepsis, and thromboembolism continue to limit MCS-related survival, especially in children weighing less than 8 kg [2,3]. Alternative support schemes with STCF pumps as long-term VADs have shown potential advantages over other long-term support forms, yet inadequate information is currently available with respect to complication rates and outcomes after prolonged STCF-VAD use[4,5]. Our case demonstrates that STCF pumps, although designed for short-term support, can successfully bridge infants or small children to transplant even if extremely long support time is needed because of notable shortage of available pediatric donor organs. However, additional studies are required to better understand the optimal management strategies and complication profiles in pediatric patients supported with these pumps [1–4].

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Conflict of interest

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