Commentary: Are we there yet? Long-term ventricular assist device therapy in pediatric heart centers

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Karthik Thangappan, MD (left), and David L. S. Morales, MD (right).

Central Message

Instead of rushing to transplant in cases of medically refractory heart failure, perhaps starting with long-term ventricular assist device therapy should become the new standard of care.

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The article in this issue of the *Journal* by Adachi¹ explores the current and changing state of affairs and mindset of pediatric ventricular assist device (VAD) therapy. Pediatric VADs have typically been used as inpatient “bridges” to the “destination” of transplantation. This is in contrast to the adult population, in which VAD therapy is often long-term, possibly permanent, and managed in the outpatient setting. In the adult VAD world, the younger patient is believed to have a higher potential for cardiac recovery; however, recovery from chronic heart failure (not myocarditis or graft rejection) is something not really pursued in the pediatric field. The fact that the vast majority of children requiring VAD support for chronic heart failure are listed for transplant as soon as feasible illustrates this. In certain pediatric centers, however, VAD therapy is being used to treat hospitalized patients with medically resistant heart failure or those who are outpatients who are not transplant candidates. Once the patient is in stable condition on VAD support, decisions about whether transplant or long-term therapy is preferable are being made, recognizing that this is a fluid state that can change with time. The pre-determination of the patient's destiny before implantation of an intracorporeal continuous-flow VAD should no longer be necessary.

There are, of course, downsides (ie, adverse events) associated with VADs, which result in the hesitancy to adopt this mindset of long-term therapy as the standard of care. As the technology and field mature, however, morbidity profiles continue to decrease, and we must remember that cardiac graft expectancy is 15 to 20 years, with retransplantation graft expectancy being worse.² The latter fact encourages us to explore pretransplant long-term VAD therapy to delay transplantation and potentially increase overall life expectancy. Waiting to list a VAD-supported outpatient provides

an opportunity even to eliminate the need for transplantation by allowing more time for myocardial recovery.³ As technology improves and VADs become modular, however, the idea that VADs can be exchanged easily without a major cardiac surgery may result in cardiac transplantation becoming the exception, not the norm, for treating end-stage heart failure in kids. Our institution has been practicing long-term therapy for some time, and we have demonstrated its benefits with HeartMate II (Abbott Laboratories, Abbott Park, Ill), HeartWare (Medtronic, Inc, HeartWare Division, Framingham, Mass), and more recently the HeartMate 3 (Abbott Laboratories) devices as long-term VAD therapy in a variety of patients with congenital heart disease (after Mustard procedure, Fontan circulation) and Duchenne muscular dystrophy (n = 6). This seems reasonable in light of the most recent data demonstrating that the 2-year survival for patients with a HeartMate 3 is equal to that of patients who have undergone heart transplantation. The development of smaller devices with better morbidity profiles will further encourage the paradigm shift of managing pediatric VADs.⁴

In conclusion, Adachi¹ does an excellent job illustrating why long-term VAD support is and should be gaining clinical momentum and why the terms “bridge” and “destination” therapy may soon become obsolete. “Yes, we are there,” because many of us in the field now routinely

consider pediatric and congenital patients for long-term VAD therapy.

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