14-year-old with dilated cardiomyopathy. With the advent of the 50-cc TAH, we anticipate that this device will benefit pediatric patients with end-stage, complex congenital heart disease.⁵

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EDITORIAL COMMENTARY

The total artificial heart in pediatrics: Expanding the repertoire

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Experience with the total artificial heart (TAH) in the pediatric population has been limited to date. Sizing recommendations for implantation of the Syncardia 70-cc ventricles generally include a body surface area (BSA) $>1.7 \text{ m}^2$ and an anteroposterior dimension (from sternum to T10 vertebra) $>10 \text{ cm}$.¹ The pericardial space must be sufficient to accommodate this sizeable device without causing venous compression, which invariably compromises device filling. The recent development of imaging software that can simulate device implantation can aid preoperative decision making for small or borderline-sized patients.² Until recently, TAH recipients required in-hospital care, but the introduction of a compact portable driver has improved patient mobility and now allows discharge to home.

Patients with congenital heart disease have demonstrably worse outcomes following left ventricular assist device implantation (especially single-ventricle patients), and the need for biventricular support confers additional risk. The TAH offers the prospect of complete restoration of hemodynamics, and wider availability of the TAH will perhaps level the playing field and improve the bridge to transplant statistics in this group of patients. Support for this proposition remains precarious, however. Worldwide, among more than 1000 TAH implants, pediatric implants accounted for $<5\%$, and

implants for congenital heart disease (all ages), only 2% .³ It is encouraging that 100% of adolescent patients with congenital heart disease (albeit only 7 patients, including the patient described in the current report) have been successfully bridged to transplantation with a TAH.^{3,4} Realistically, experience with the TAH in adults reveals outcomes similar to those seen with biventricular assist therapy.⁵

Syncardia has designed a smaller version of the TAH with 50-cc ventricles, planned for use in diminutive adults and adolescents down to a BSA of 1.2 m^2 .⁶ Following approval, this device should dramatically expand use of the TAH in the pediatric population. As with the adoption of VAD technology, pediatric centers will benefit from the experience achieved by adult programs that use TAH technology. Further clinical use will necessarily define the appropriate

PA and lateral radiography after Syncardia TAH implantation.

Central Message

The use of the Syncardia TAH in pediatrics, especially for congenital heart disease, is likely to increase.

See Article page e71.

indications for the TAH in pediatrics, but for now, it appears that the TAH will play an increasingly important role in the surgical management of pediatric biventricular heart failure.

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